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Koichi "K" Nishimura and Winston Chen of Solectron

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Story starts on page 52

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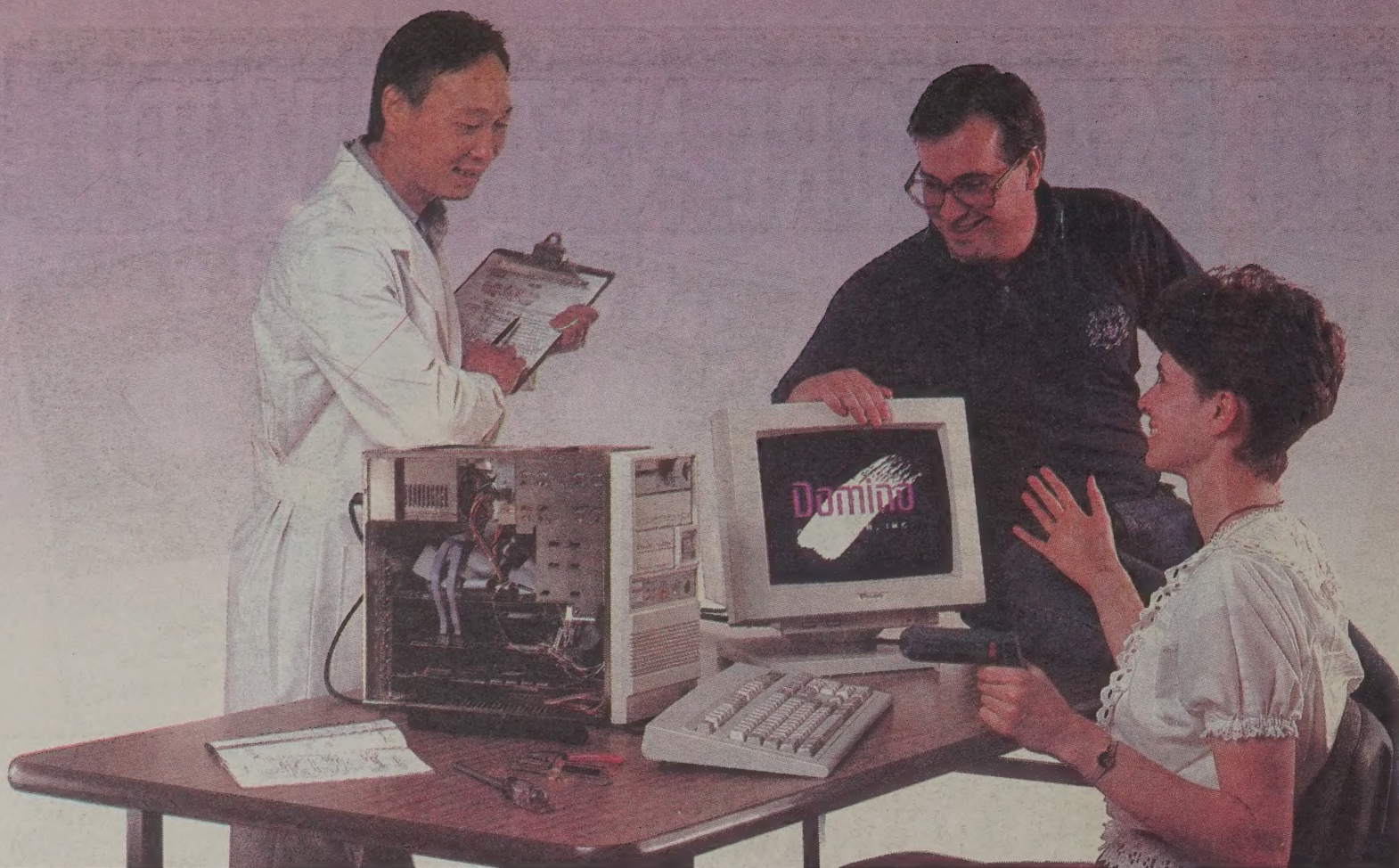
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Story starts on page 158

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Story starts on page 108



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Bitcom for Windows (Software for modem)	\$59
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Everex Tempo LX 60MB Notebook	\$1599

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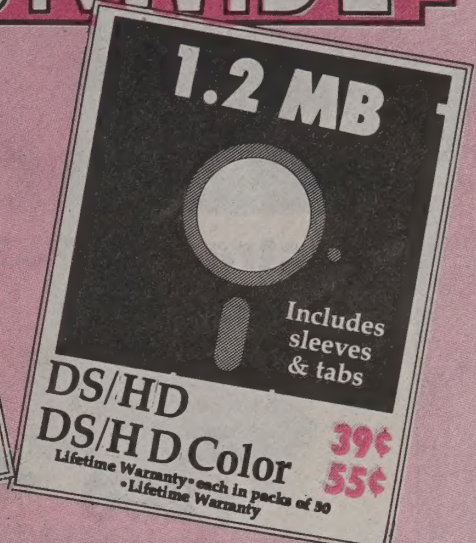
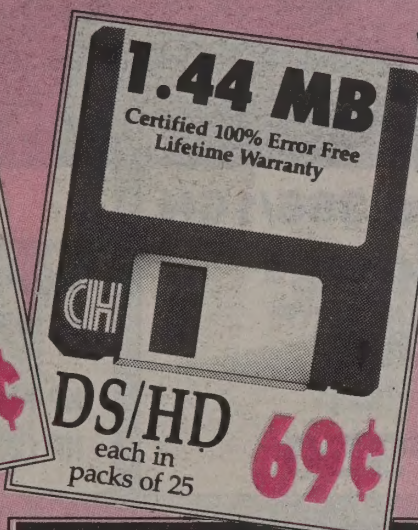
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DC2080	80MB	18 ⁹⁵	18 ⁹⁵
DC2120	120MB	21 ⁹⁵	20 ⁹⁵
DC2120	XIMAT Formatted 120MB, 3M	31 ⁹⁵	
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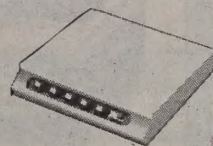
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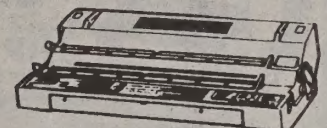
OPTICAL DISKS

650MB\$169⁹⁵

CS-600HD\$16⁹⁵

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CS-600 HD 60MB	16 ⁹⁵	15 ⁹⁵
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PaintWriter XL	25 ⁹⁵
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New High Capacity	29 ⁹⁵
PaintJet 51606	26 ⁹⁵
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NEW—Recycled GRC HP LaserJet II, IID, III, IIID Cartridges	69 ⁹⁵
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Citizen GSX-140	4 ⁹⁵
Epson LQ-800	4 ⁹⁵
Okidata 192/193	2 ⁹⁵
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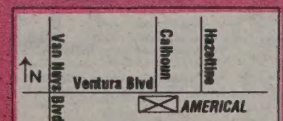
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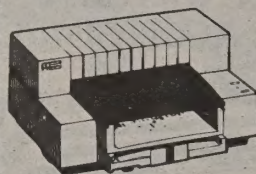
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HP 14" SVGA Color	349	319
HP 14" Ergonomic SVGA	490	440

HP 40 MB Tape Back Up **\$540 \$490**

HP 120 MB Tape Back Up **640 590**

HP PRINTER BLOWOUT



HP DESKJET/ DESKWRITER

HP DESKJET C/ DESKWRITER C

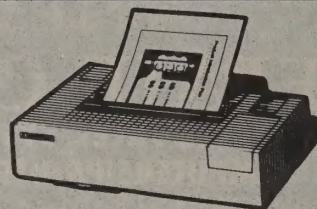
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(MAC)

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- 3 year warranty
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HP PAINTJET/PAINTWRITER

(IBM)

(MAC)

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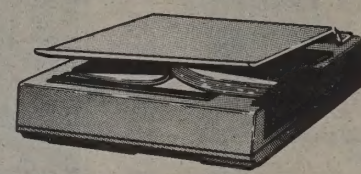
- Apple Talk built-in for Apple users

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- 15 seconds per page

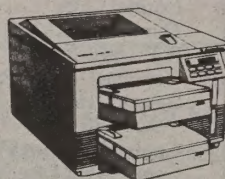
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LASERJET PRINTERS

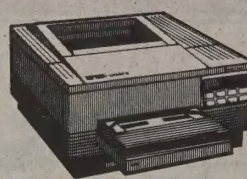
HP LASERJET IIIsi

- 17 pages per minute
- Scalable fonts
- 2 trays, 500 sheets each tray
- JP PCL & HP-GL/2 built-in



HP LASERJET III

- 8 pages per minute
- Built-in scalable typefaces
- Faster graphics printing
- PCL 5 printer languages



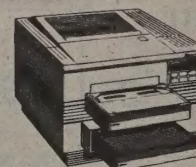
\$1450

HP LASERJET IIID

- 8 pages per minute
- Built in scalable fonts
- 1 meg Ram
- 20,000 pages per month

(Includes Toner Cartridge)

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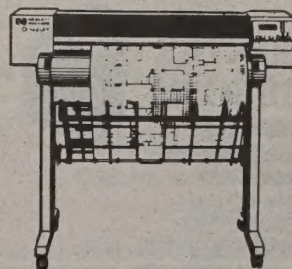
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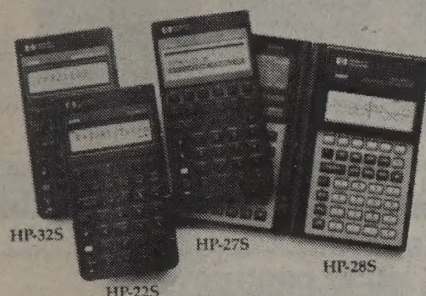
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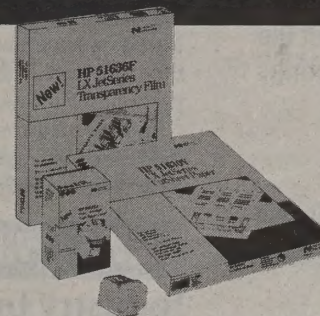
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HP 48SX Calculator	\$270
HP InfraRed Printer	99
HP 20S Calculator	39
HP 28S Calculator	175
HP 17BII Calculator	82
HP 19BII Calculator	135

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DeskJet Font Family

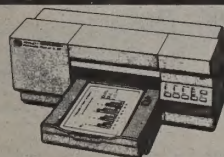
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A NOTE FROM THE EDITORS

Generally we don't hear too much about the manufacturing side of the computer industry—except frequent complaints about its offshore migration. Quality-obsessed and award-winning Solectron Corp. has been getting a lot of attention lately as a result of its receiving the Malcolm Baldrige award last year, and we thought its chairman Winston Chen had some valuable insights to offer. We hope you agree—the story starts on page 52.

Also in the valuable insights area, we present the second part of our interview with Autodesk founder John Walker, which starts on page 63.

—ME

COVER STORY

Quality Is Alive And Well In Milpitas *By Mary Eisenhart* 52

Cover and contents photos: Paul Winternitz
 Much has been written about the decline of US manufacturing in the high-tech industry, but don't tell it to Solectron. The fourteen-year-old Milpitas-based company makes boards and other components for such clients as Sun, Apple, Hewlett-Packard and IBM, and has just exported its unique manufacturing style to a new plant in Malaysia.

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Coming to the Beverly Hilton on June 23, this event is the place to check out the current and future state of multimedia.

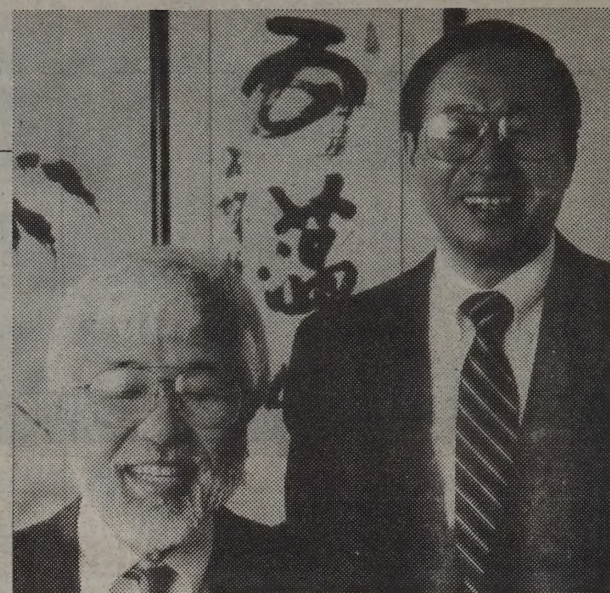
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Your First Computer

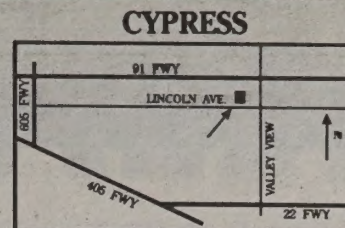
- By Mike Markowitz* 74
- Building a computer-based entertainment system.

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- 1.2 Mb, 5 1/4" and 1.44 Mb, 3 1/2" Floppy
- IDE 1:1 Dual FD/HD Controller
- AT I/O (2 Serials, Parallel, Game) Ports
- Mini Tower Case w/200W Power Supply
- 101 Enhanced Keyboard
- VGA Monitor and VGA Card
- Network Certified
- Operation Manual

\$969

HOME/BUSINESS SYSTEM

MicroTek 386DX-33 MHz w/64K CACHE

- AMI Bios
- Real Time Clock and Calendar w/Rechargeable Battery
- 4Mb RAM Installed
- 80287 Math Co-processor Socket
- 80Mb Hard Drive
- 1.2 Mb, 5 1/4" and 1.44 Mb, 3 1/2" Floppy
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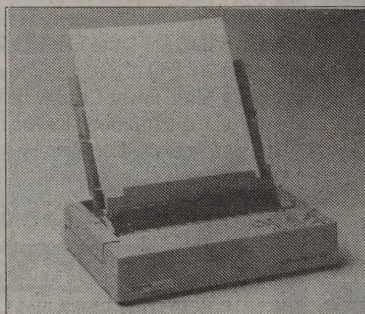
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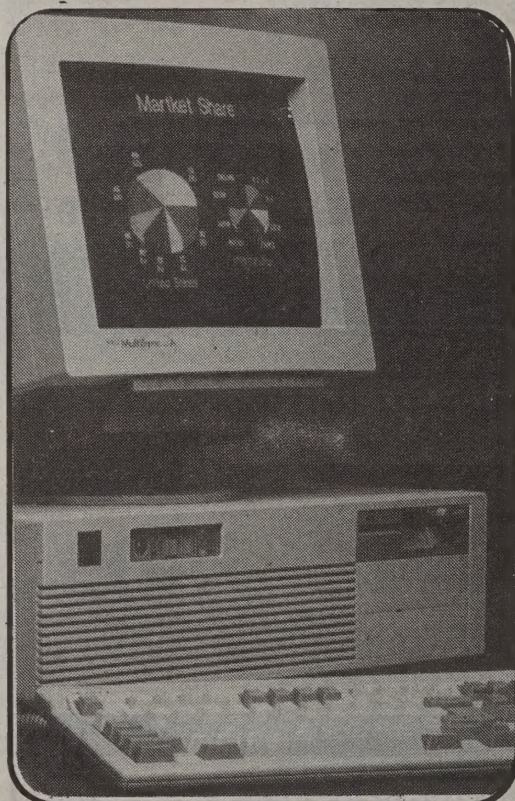
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The CODE 252 virus, the annual trivia contest, and more.



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- 101 Enhanced Keyboard
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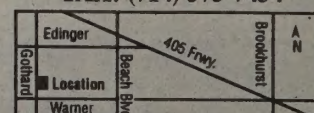
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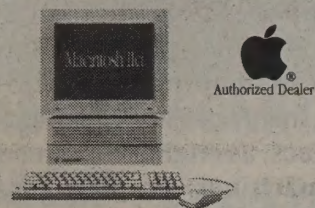
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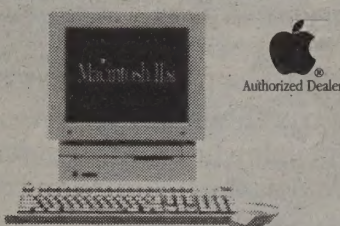
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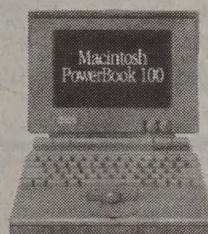
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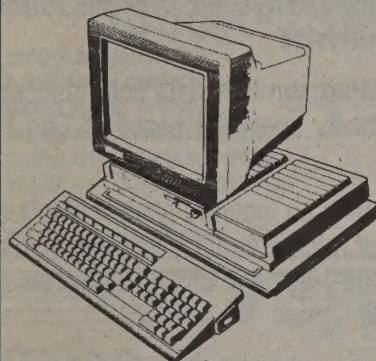
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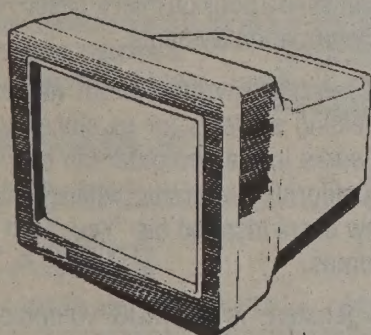
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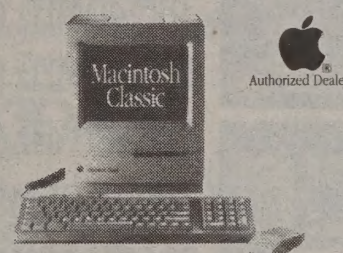
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CONTRIBUTORS

Seven years ago, Matthew Leeds started writing a column for us about Commodore machines. Shortly thereafter, the Amiga came along, Matthew became an early zealot, and his column changed accordingly.

In this month's Guest Editorial, Matthew bids farewell to the Amiga column. We'll let him speak for himself and simply note that we've heard his concerns echoed by a

lot of people in the Amiga community.

We hasten to add, however, that we are not going to stop writing about the Amiga. We want to hear from people who are doing interesting things with these machines, whether it's the latest Toaster tricks or some innovative use yet undreamed of. We want to hear from people who want to write about the Amiga. And as the information comes to us, we'll pass it along to you.

We fully recognize that the Amiga community is one of the most ingenious and dedicated groups of people in existence, and we hope to be able to continue to serve that constituency. Clearly the Amiga will survive in some form long into the future—on the inside of Toasters that attach to PCs and Macs, as engines for arcade virtual reality machines, etc. But essentially, the Amiga's future is largely dependent on Commodore, which we hope realizes the potential of its once-state-of-the-art computer and makes it the contender it could have been.

—ME

John C. Dvorak is a columnist, book author, software publisher, and radio talk show host. He interviews the devil but avoids signing the contract.

Bennett Falk works in tech support at Sybase. He has been known to frequent radicchio establishments in Emeryville.

Peter John Harrison is a data communications and connectivity specialist based in San Francisco.

Paul Hoffman is an industry analyst who's been writing about microcomputer technology for ten years, and the author of several books on computer-related topics.

Ed Kahn lives in Studio City and writes about laptops and other PC technology.

Woody Liswood has been writing about microcomputer hardware and software since 1980. He has also published a book on micro-based Human Resource Information Systems.

Mike Markowitz has written about games and other interesting subjects for us since our first issue. He works in the computer lab of a major Southern California university, where the questions of new users inspired his "Your First Computer" columns.

David Morgenstern is a BMUG volunteer and works in the library at San Francisco State.

Tony Reveaux is a San Francisco-based consultant, the editor of *Computer Publicity News*. He's also a contributing editor for *Artweek*, and writes the "MediaScan" column in *Film/Tape World*.

Jim Warren, a man of many accomplishments in the computer industry over the years, recently chaired the First Conference on Computers, Freedom & Privacy. He also serves on the board of directors of Autodesk.

LAN columnist Wayne A. Yacco is a consultant and writes for many computer publications on a variety of subjects. He lives in Burbank.

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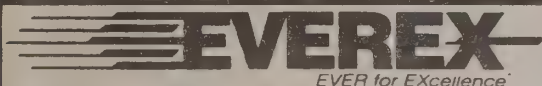
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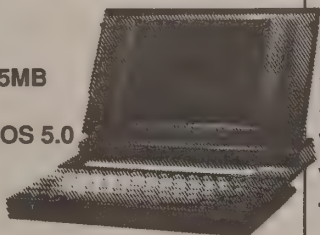
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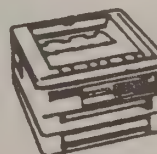
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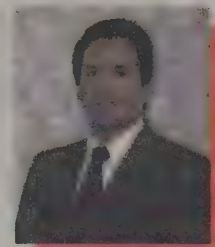
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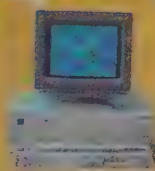
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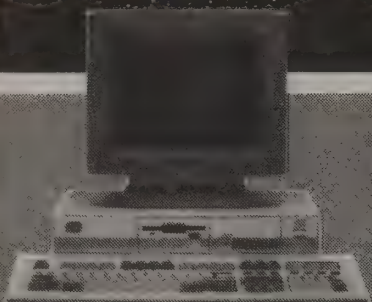
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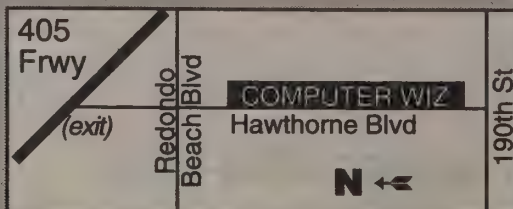
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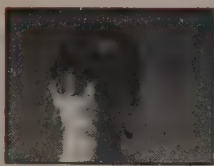
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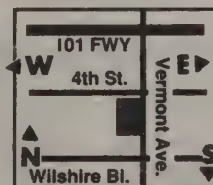
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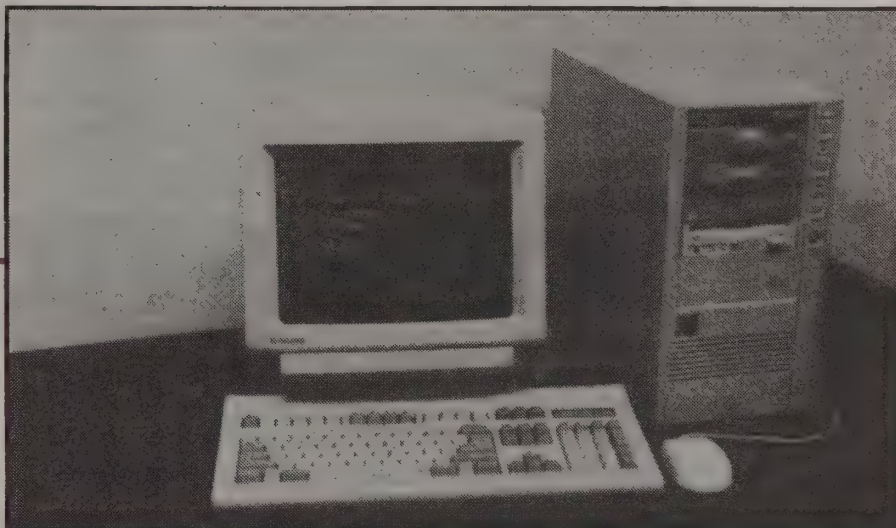
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INDUSTRY INSIGHT

ACE's Uncertain Future

**BY PAUL
HOFFMAN**

THE RISE AND FALL OF ACE— MICROSOFT WINS AGAIN

The ACE consortium may fall apart by the end of this year due to lack of interest and the loss of two of its major standardbearers, Compaq and the Santa Cruz Operation.

ACE was founded last year to support a RISC-based alternative to high-end Intel platforms, but it now appears that most customers don't mind relying on Intel and Intel's pricing strategy, especially now that there are many competitors in the Intel-compatible market. Microsoft, meanwhile, has pledged to continue its push to port its forthcoming Windows NT operating system to non-Intel platforms regardless of whether or not ACE succeeds.

The premise when ACE was formed was that large companies like DEC and Compaq needed more leverage in the low end of the workstation market, dominated by Sun with its SPARC architecture. The ACE participants wanted one or two major operating systems running on the MIPS R4000 RISC processors as hedge against Intel CPUs and Microsoft's MS-DOS or IBM's OS/2. The operating systems were to be Windows NT from Microsoft and the popular SCO UNIX from the Santa Cruz Operation.

ACE members assumed that their customers would be clamoring for UNIX-based RISC systems by this year and didn't want them all to go to Sun or be forced to settle for 486-based systems that often seem underpowered. However, there has been no groundswell of interest in these systems.

Compaq has had significant business problems in the past few months. After a corporate shakeup, Compaq is now going to concentrate on the mainstay of its sales, the high end of the PC market. According to Compaq, their departure from the ACE consortium was mainly due to lack of interest from their cor-

porate customers for non-Intel hardware. Given that Intel is widely expected to release faster 486 CPUs and the new 586 CPU later this year, and given that NT will run on these systems (as well as current 386 systems) first, the value of the ACE consortium became moot to many Compaq customers. As long as Microsoft continues to port NT to other platforms, including the R4000 CPU and DEC's newly announced Alpha RISC, customers will be satisfied about possible directions for future growth if Intel doesn't deliver low-cost CPUs.

Compaq cited other reasons for the decision not to manufacture a RISC-based system in the near future. Sun's Solaris operating system will run on both SPARC-based computers and Intel-based computers by the end of this year (although Sun is significantly behind its announced schedule for releasing Solaris); Sun and Compaq could easily sell Compaq computers already loaded with the Solaris operating system and network hardware. UNIX System Laboratories (USL) is aggressively moving into the Intel-based market, as shown by its recent agreement with Novell under which the latter will sell UNIX for the first time. Compaq even said that the availability of NeXT's NeXTStep operating system on Intel-based systems would reduce the need for ACE-compliant computers.

After Compaq's announcement, the Santa Cruz Operation also withdrew, leaving ACE with one operating system instead of two. SCO cited both Compaq's exit and Microsoft's porting of Windows NT to the Alpha CPU as reasons for its departure. It is widely assumed that DEC will stop producing R4000-based systems soon after its Alpha chip is ready. With neither DEC nor Compaq backing ACE-compliant systems, there won't be much of a market for them, and the cost of porting SCO UNIX to the R4000 would be prohibitive un-

Compaq attributed its departure from the ACE consortium to lack of interest in non-Intel hardware from its corporate customers. Since Intel is widely expected to release faster 486 CPUs and the new 586 CPU later this year, and since NT will run on these systems first, the value of the ACE consortium became moot to many Compaq customers.



Paul Hoffman is an industry analyst who has been covering microcomputer technology for ten years. He can be reached on Internet (phoffman@well) and MCI Mail (264-3171). He also writes popular microcomputer books.

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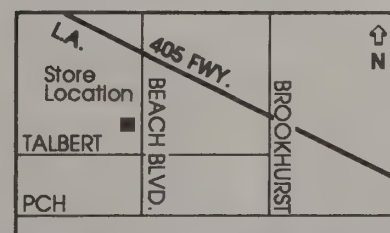
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less SCO was guaranteed a large market.

One of the major unstated reasons for many ACE members' growing disenchantment is Silicon Graphics' purchase of MIPS earlier this year. They worry that Silicon Graphics will have too much power over the future of the R4000 CPU, giving SGI an unfair advantage in the ACE market. SGI is growing so fast that it may become a significant contender in the ACE market, something no one was worried about when MIPS was independent.

The winner of the rise and fall of ACE is still clearly Microsoft. Given that Windows NT has been written from the beginning with the intention to port it to different CPUs, Microsoft stands to win whether ACE succeeds or fails. If ACE can stay together and be a force in the industry, all ACE systems will now, by default, run Windows NT. If it fails, Microsoft will probably still make back its investment in porting Windows NT, because companies like SGI will still want the operating system—

ACE was founded last year to support a RISC-based alternative to high-end Intel platforms, but it now appears that most customers don't mind relying on Intel and Intel's pricing strategy.

and may have to spend even more for it if there are fewer players in the field. DEC will probably want Windows NT for both its current R4000 systems and its future Alpha systems, particularly now that it's trying to get a significant share of the PC market.

FLASH MEMORY: THE HARD DISK ALTERNATIVE

It took much longer than expected, but Intel and other companies are starting to release "hard disks" that don't have a disk at all, but are made of low-cost flash RAM. Although flash RAM "disks" are still much more expensive per megabyte than traditional drives, their advantages for portable computers are significant.

Intel is the first major company to offer a flash memory card to the general market. The new Series 2 cards are in the small PCMCIA format, about the size of a credit card. Many newer portable PCs have PCMCIA slots, and some companies are developing PCMCIA adapters for desktop PCs. A 20MB Intel flash memory card costs over \$600 at wholesale, about three times the price of small hard drives for portables. Other companies will probably follow Intel's lead within the next few months.

Among the advantages of the flash memory cards for portable computers:

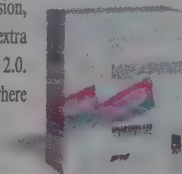
- Much higher reliability than hard disks, because they have no moving parts. Many of the repair problems encountered with today's portables are due to hard disk failure; because there are no moving parts, you can safely use a flash memory hard disk even when the computer is vibrating.

- Flash RAM is much lighter per megabyte, so the overall weight of a portable PC is reduced. Depending on the type of hard drive used, this can cut the weight by as much as 20%.

- The cards draw much less power than

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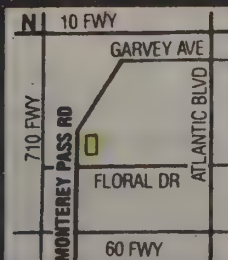
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hard disks, allowing portable PC manufacturers to design their computers around smaller batteries.

•The technology allows manufacturers to design smaller hard disks for systems with little storage requirement.

For example, Intel is also offering 4- and 10MB cards at proportionally lower prices. A portable manufacturer might design a computer with a 10MB card with MS-DOS and WordPerfect preinstalled, leaving about 6MB for documents. For someone who only does word processing, this would be plenty of space, and the computer could be much smaller and lighter than one with a hard disk.

There are still significant disadvantages to flash memory beyond the price. Flash memory takes much more time to erase than hard disks—it may take a few seconds to erase a file. Also, depending on the design of the flash memory chips, erasing or overwriting flash memory is much more wasteful than the same operations on hard disks. The blocks on flash memory disks are much larger. However, good design of the interface to the operating system can minimize the negative effects.

At the same time Intel announced its cards,

Microsoft announced an extension to MS-DOS and Windows that handles flash memory cards in a standard, economical fashion. The device driver gives hardware companies a single standard to use so that they can be sure that their flash memory cards will work with future versions of the operating systems. The new Microsoft software also allows developers to write software optimized for flash memory, so it uses the least space and runs as fast as possible.

3.5" DISKETTE SHORTAGE— MORE SOFTWARE UPDATES

Software manufacturers have had a hard time finding 3.5" diskettes lately due to a shortage that may last for at least another six months. Diskette manufacturers have been reporting a large increase in demand for their lower-quality, no-label diskettes since late last year. The crunch got so bad in April that wholesalers of the diskettes were putting customers on allocation.

Diskette manufacturers such as Sony and Maxell are not having any problems with their supply of the commercial diskettes that you buy in stores. These diskettes are of higher

quality and sell for much higher prices than the bulk diskettes used for software packages; most diskette manufacturers make sure that the higher-cost diskettes are top priority. Also, there seems to be no shortage of bulk 5.25" diskettes—the market is shrinking and a relatively large backlog has built up.

The main reasons for the shortage of the bulk 3.5" diskettes are a steady shift away from the 5.25" diskette drives in new PCs and more frequent revisions in software packages. As you can see in the advertisements here in *MicroTimes*, most computers are offered with either a 3.5" drive or a choice of 5.25" and 3.5" drives. Dealers that offer a choice between the two sizes say that about 70% of their customers choose the 3.5" drives.

**The main reasons
for the shortage of
the bulk 3.5"
diskettes are a
steady shift away
from the 5.25"
diskette drives in
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Technology News From Japan

(Excerpted from
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- **NTT** has introduced a multimedia database service based on ISDN technology. The "Hi CAPTAIN HG" service enables users to combine text, graphic, and image data to create, retrieve, and transmit multimedia documents using PCs. The system uses a UNIX server, supports Ethernet, and offers electronic mail and BBS functions.
- **NEC** has begun to offer the GENie online service to subscribers of its PC-VAN telecommunications network. At present GENie is available only through selected access points, but NEC plans to offer more access to PC networks in the future.
- Japan's **Computer Software Copyright Association** and the **Business Software Alliance (BSA)** of the US will join forces to protect intellectual property rights and prevent illegal software copying. The Japanese organization is an incorporated body approved by the Agency of Cultural Affairs and has 160 corporate members. As part of the move, BSA will set up an office in Japan as early as this summer. US-made software is enjoying increased market share in Japan, and cooperation between the two associations is expected to increase the effectiveness of the ongoing campaign against illegal copying.
- **Tomcat Computer** has developed a new board that allows users of PC/AT computers to run applications based on Japan's dominant standard, the NEC PC-9801. Priced at under \$800, the board will be marketed by several dealers of AT-compatible machines based on the Intel 80486.

The Apple Macintosh has always used the 3.5" drive exclusively, and was the major force for the drive's popularity.

Bulk diskettes became particularly scarce in March and April, as Microsoft and IBM released upgrades to Windows and OS/2. Microsoft shipped over one million copies of Windows v3.1, each with six diskettes; IBM shipped over two hundred thousand copies of OS/2 v2.0 with a whopping twenty-one diskettes per package.

The software market now consists primarily of revisions to existing programs, and many software manufacturers are turning out their revisions more often. The result is a rapid increase in demand for bulk diskettes. Smaller software companies and duplicating services will have to pay higher prices for the diskettes for at least three more months, and some may even be forced to buy premium diskettes at twice the cost of the bulk diskettes in order to get their software out. ■

Computer Stocks Rise Despite Mixed Signals From Economy

Stocks of computer companies, as represented by the Microtimes Stock Index, posted strong returns for the month ended May 8, as investors formulated their strategies to take advantage of economic recovery. For the trading session, our index gained a robust 2.12%, or 75.47, before ending matters at 3642.36.

The discussion on Wall Street now centers not on when economic recovery will happen, but where, and how strong the comeback will be. Investors, however, weren't waiting as they shook off some contradictory signals from the economy and swept stocks higher with a round of buying. Specifically, the Dow Jones Industrials gained 3.50% en route to a closing mark of 3369.41.

One of the reasons for the bullish sentiment was some stronger-than-expected earnings reports, and the companies in our index reflected this trend.

Informix, for example, saw its shares gain 17.24%, or \$5.00, en route to a closing price of \$34.00. During the month the company announced first-quarter net income of \$0.73 a share, up from a loss of \$0.16 during the same period a year ago.

Shares in IBM rebounded strongly during the month, as investors were encouraged by many of the moves being made by Big Blue. These included plans to sell computers directly to consumers through mail-order, as well as plans to invest \$500 million in Time Warner's entertainment business. For the month, shares in IBM gained \$7.13 before ending matters at \$93.13.

Motorola led all dollar-gainers during the month, as its stock price climbed \$8.00 to end the trading session at \$82.13. Investors were encouraged by the firm's announcement of a joint cellular venture with Northern Telecom, which helped push Motorola's shares higher.

On the negative side of both earnings and stock performance were shares in Borland International as a charge against earnings resulted in a fourth-quarter loss of \$1.05 per share. This compared unfavorably in investors' minds to the \$0.11 per share of earnings that the firm announced for the same period a year ago. For the month, shares in Borland dropped \$3.38 before closing at a price of \$48.63.

EXCH	COMPANY	TICKER SYMBOL	CLOSING PRICE 04/10/92	CLOSING PRICE 05/08/92	NET CHANGE IN PERIOD	PERCENT CHANGE IN PERIOD	PRICE/EARNINGS RATIO	ANNUAL DIVIDEND RATE	YIELD	52 WEEK HIGH	52 WEEK LOW
SOFTWARE											
OTC	Adobe	(L) ..ADBE	39.88	46.75	6.88	17.24	21	0.32	0.68	68.50	37.50
OTC	Aldus	(L) ..ALDC	22.38	22.00	-0.38	-1.68	15	0.00	0.00	54.50	19.00
OTC	Autodesk	ACAD	34.50	34.00	-0.50	-1.45	15	0.48	1.41	62.25	23.25
OTC	Borland	BORL	52.00	48.63	-3.38	-6.49		0.00	0.00	86.75	39.50
OTC	Informix	(H) ..IFMX	29.00	34.00	5.00	17.24	20	0.00	0.00	36.00	5.25
OTC	Lotus	LOTS	33.25	31.50	-1.75	-5.26	24	0.00	0.00	40.75	18.00
OTC	Microsoft	MSFT	116.00	114.50	-1.50	-1.29	35	0.00	0.00	133.25	60.50
OTC	Novell	NOVL	54.13	52.38	-1.75	-3.23	43	0.00	0.00	65.00	22.63
OTC	Oracle	ORCL	13.25	15.50	2.25	16.98	55	0.00	0.00	21.13	7.00
OTC	Software Publishing	SPCO	18.00	13.50	-4.50	-25.00		0.00	0.00	26.25	12.50
OTC	Symantec	SYMC	43.00	39.50	-3.50	-8.14	53	0.00	0.00	51.00	19.50

HARDWARE											
OTC	Apple	AAPL	55.50	62.00	6.50	11.71	23	0.48	0.77	70.00	40.25
OTC	AST Research	ASTA	16.25	18.88	2.63	16.15	9	0.00	0.00	32.25	14.50
NYS	Commodore	CBU	13.88	12.13	-1.75	-12.61	8	0.00	0.00	19.25	10.13
NYS	Compaq	CPQ	24.88	25.00	0.13	0.50	35	0.00	0.00	51.25	22.13
NYS	Digital Equipment	(L) ..DEC	45.25	45.25	0.00	0.00		0.00	0.00	71.75	43.50
OTC	Dell	(H) ..DELL	25.63	28.00	2.38	9.27	20	0.00	0.00	28.63	13.84
NYS	Hewlett-Packard	HWP	75.00	80.25	5.25	7.00	24	0.80	1.00	85.00	44.63
NYS	IBM	IBM	86.00	93.13	7.13	8.28		4.84	5.20	107.38	81.63
NYS	Silicon Graphics	SGI	18.00	18.00	0.00	0.00	22	0.00	0.00	29.75	13.25
OTC	Sun Microsystems	SUNW	27.75	29.75	2.00	7.21	15	0.00	0.00	37.63	20.75
NYS	Xerox	XRX	72.25	72.25	0.00	0.00	18	3.00	4.15	82.25	51.50
NYS	Tandy	TAN	27.63	28.25	0.63	2.26	13	0.60	2.12	34.38	23.38

CPUS											
NYS	Advanced Micro Device	AMD	16.63	17.88	1.25	7.52	7	0.00	0.00	21.50	8.38
OTC	Intel	INTC	51.13	53.38	2.25	4.40	14	0.00	0.00	68.75	38.50
NYS	LSI Logic	(L) ..LSI	7.25	7.13	-0.13	-1.72	48	0.00	0.00	10.75	6.25
OTC	MIPS	(L) ..MIPS	10.63	9.13	-1.50	-14.12		0.00	0.00	17.63	7.38
NYS	Motorola	(H) ..MOT	74.13	82.13	8.00	10.79	23	0.76	0.93	83.75	54.00

COMMUNICATIONS											
NYS	AT&T	(H) ..T	41.88	43.75	1.88	4.48	93	1.32	3.02	44.38	32.88
NYS	BellSouth Corp.	BLS	44.38	48.88	4.50	10.14	15	2.76	5.65	52.63	43.38
OTC	MCI	MCIC	31.25	32.63	1.38	4.40	16	0.10	0.31	36.13	25.25
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					04/10/92	3566.89	3255.37
					05/08/92	3642.36	3369.41

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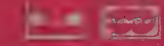


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Flying Exercisers, Digital Hot Rods & Lots More

BY JIM WARREN

This column concerns near-future applications and products—viable possibilities within five years or less—“fantasies” only because some innovative technoid or entrepreneur hasn’t yet implemented ’em.

EXERCISING COMPUTER SCENES

Len Freedman (Newark, CA) suggests interfacing home exercise machines to home computers—sort of a MIDI interface for thigh-

REALIZABLE FANTASIES

flexers. Then, computer-generated displays could provide bicycle races or ride-by scenery for exercise bikes. Rowing machines could compete with video racing shells. A pedal-powered “airplane” might be implemented by hooking an RPM sensor to the game-port plug that acts like the throttle to Flight Simulator. Warm up your engine, then pedal up into the virtual air.

Maybe we could mix metaphors. How about rowing off the flight deck and steering with the oar-pulls on a rower? Horror-movie fans could hook a stepper-machine to videos of angry demons chasing them—just like childhood nightmares... On second thought, scrub the last idea.

THROTTLE HACKERS

Half a dozen companies now make “superchips,” used to soup up computer-controlled automobile engines by replacing wimp-prone original equipment, according to a November 11 article in *Time* last year. These superchips may increase horsepower by 10%–30% when using high-test gas.

But these prefab chips are for amateur tinkerers. He-manly (and she-womanly) hot-rodders should hack their own engine controls—sorta like milling their own heads or grinding their own crankshafts. So give ’em a fully programmable dashtop computer with an umbilical that’ll plug into the engine, replacing the factory computer. Of course, it must either meet the requirements of the Clean Air Act—which now applies to car parts as well as cars—or it’ll join the ranks of pirate TV unscramblers and pirate radio stations.

PERMIT VARIETY

Robust software—operating systems, word processors, spreadsheet programs, print utilities, etc.—allows users to set “default preferences.” These are the settings that automatically apply every time a program starts up. Unfortunately, many programs currently permit only a single set of defaults.

Preferences are often stored in a single global file—in the application program’s home directory or perhaps cluttering up the root-directory or folder. As an appalling alternative, some programs’ default-preference settings are modified only by changing the application program itself.

Minimally adequate, modern programs *should* (a) save default

settings in separate, named “preferences” files; (b) permit a different preference file for a given application in each subdirectory or folder; and (c) have a “default-default” preferences file in the application’s home directory (not in the root directory). When the application is

This year, the FBI wants Congress to pass its “Digital Telephony” bill. It would require all private PBX systems and public phone systems to be equipped so agents’ ability to “intercept communications is unimpeded.” Nationwide remote wiretaps at the touch of a keyboard.

launched, it should first search the current subdirectory for a preferences file, then look in its home directory for the default-default file. If no preferences file is found, it should create the one in the home directory from internal “factory settings.”

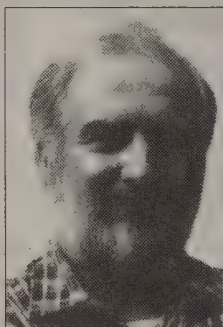
This way, users can have different preferences for different uses of an application. And, of course, users can modify the default-default file in the home directory—at their own risk.

THWARTING COMPUTER INTRUDERS

On all shared/host computer systems, let’s automatically encrypt *everything*—or at least all email and data files. I.e., scramble the cracker attractors. Do it at the operating-system or file-system level. Have files unencrypted only when in use by their owners.

Of course, the FBI, IRS, NSA, SS, DEA, INS, office managers, and all the other folks that want to watch what we write wouldn’t be real happy about this.

Note: Last year, the FBI was reportedly behind legislation (in SB266) requiring that telecom companies provide a “back door” to all encrypted traffic so agents could access “the clear text contents of all voice, data, and other communications.” Once word of it leaked out,



Copyright © 1992 by Jim Warren, 345 Swett Rd., Woodside, CA 94062; email/ jwarren@well.sf.ca.us. Permission herewith granted to copy-in-full for nonprofit purposes. Jim Warren founded InfoWorld, the DataCast proposal for paperless electronic newspapers, Wireless Digital, Initiative, Inc., and one of the nation’s largest public microcomputer conventions. He was founding host of PBS’s Computer Chronicles, founding editor of Dr. Dobb’s Journal, and has chaired various computer trade and professionals’ organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center), and mathematics.

He organized and chaired the landmark First Conference on Computers, Freedom & Privacy (1991), sponsored by a dozen nonprofit and industry organizations, received one of the first Electronic Frontier Foundation Pioneer Awards (1992), and is a member of the board of directors of Autodesk, Inc.

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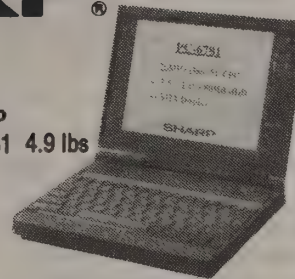
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NEWS & VIEWS

the legislation was quickly withdrawn.

This year, the FBI wants Congress to pass its "Digital Telephony" bill. It would require all private PBX systems and public phone systems to be equipped so agents' ability to "intercept communications is unimpeded." Nationwide remote wiretaps at the touch of a keyboard. It says telephone rate-payers should pay the costs, and all regulatory hearings about it could be secret—"closed to the public." Of course, agents would only use it *legally*...

You may recall that, for decades, FBI founder J. Edgar Hoover had agents conduct rampant wiretapping to build dossiers on his political opponents and anyone else who interested him.

QUICKIES

•Wireless networking is one of the hottest areas for entrepreneurial and technology development for at least the next half decade. It allows computers to communicate by radio transmission rather than wires. It's applicable to all networking environments, LANs (local-area networks; probably pricey but useful), WANs (wide-area networks), and "MANs" (metropolitan-area networks; an illustrative term used by wireless designer Dewayne Hendricks of the also-illustratively named Tetherless Access, Ltd., Fremont, CA).

Wireless datacomm will really start moving, now that the WARC (World Administrative Radio Conference) has allocated significant radio spectrum for digital communications. Let's just make sure that big players like Motorola and IBM don't monopolize that spectrum.

•Robert Harrington (Ann Arbor, MI) wanted to pass around copies of my March column, but noticed that it was copyrighted with all rights reserved. OK, restrictions now lifted for nonprofit use.

•Know of any shoddy government work—that is, illegally shoddy? Modem the details to the Whistle Blower's BBS run by Rep. Robert Wise (D-WV) at (202)225-5527, 8-N-1, 300/1200/2400.

•Is it true that the new experimental fighter that crashed in May did so due to computer malfunction?

•It is true that the General Accounting Office singled out software deficiencies as "a major reason for the delay and increased cost" of the C-17 transport plane. It's two years behind schedule and \$1,500,000,000 over budget. That is, the cost overruns *alone* on this new military toy are twice the estimates for rebuilding the six thousand-or-so malls, stores, and homes destroyed in the LA riots. The DOD says they need the new—nonfunctional—C-17 because their old transports are wearing out. Isn't it strange how new aircraft can't be built from those old, tried-and-proven designs?

•And, did you hear about the used Lisa disk drive that was for sale in April at a Silicon Valley store? The one that had a SCIF label on it? SCIF stands for "Sensitive, Compartmented Information Facility"—one o' them hyper-secret government facilities.

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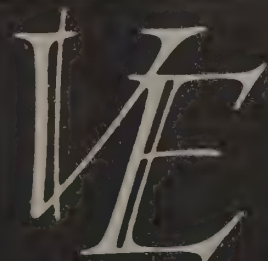
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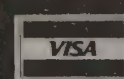


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Matthew's Farewell To The Amiga

A Great Machine In Search Of A Great Company

BY MATTHEW LEEDS

Those of you who read the entire magazine may have noticed that in the last year or two I've been writing more than just this column, and that most of the other writing has not been about the Amiga. Those of you who only read this column, bless you.

This will be my last regular Amiga column. While I've written my columns in the past for my readers, this one's for me. I hope you'll read it.

I'll still be contributing to *MicroTimes*, writing

AMIGA

reviews, articles on multimedia, video, new technologies, and other stuff that catches my interest. But after seven years of non-

stop coverage of the Amiga (the longest continuous coverage outside of *AmigaWorld*), it's time for me to move on.

THE UNFULFILLED PROMISE

I started writing about the Amiga because it was the most exciting computer available. Priced so that anyone could buy one, with a true multitasking operating system, incredible animation capabilities, lots of color, great sound, and other features considered radical in 1985 when it was released. Over the years I felt privileged to write about new products, new developments, and the future of the Amiga.

I switched careers, from photography to software, hoping to do my part to make the Amiga a success. It was a heady time, traveling across the country to trade shows, meeting with users and other developers, learning all I could about the Amiga and passing that information on to you.

Over the years I began to see a pattern emerge, one that disturbed me. While the Amiga had great potential, that potential seemed buried behind the inept marketing and lack of vision that Commodore brought to the platform. Certainly there were talented engineers working at Commodore, the hardware and operating system were proof of that. But the Amiga never caught on in the general business community—and overtime, less and less with consumers as well. While some success occurred in Europe, the North American

market withered.

I moved from company to company in the Amiga market. None seemed able to make a real go of it. Finally I started working for a software developer who addressed the entire consumer market—MS-DOS, Mac, Amiga, C-64, Apple. Even, for a time, Atari. I had the opportunity to work with other systems, try out other software, learn about other hardware, compare the Amiga to other computers. I learned a lot.

I learned that while the Amiga's operating system is (in my humble opinion) the most powerful available for a consumer system, its power is inaccessible to most users. The very features that provide that power are hard to understand, difficult to master, and not well integrated. I learned that what had been innovative and cutting-edge in 1985 was now passé. Commodore had failed to keep up with its competition.

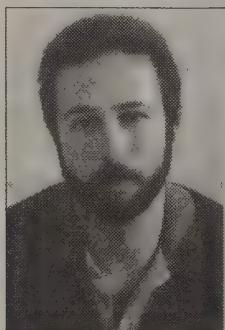
OTHER PLATFORMS KEPT GETTING BETTER

DOS systems had 256-color VGA displays (with palettes of over two hundred thousand colors) and many had 32,000-color displays. Sound cards for DOS systems equaled and bettered the Amiga's native sound capability. DOS systems came with a hard drive, and the total cost for a 386-based system was less than that of a 68000-based Amiga 2000.

Macintosh systems had fallen in price. They too had a 256-color standard display, with a palette of sixteen million, and could easily be expanded to display that entire range. They had decent built-in sound and hard drives. The operating system, while still not multitasking, had in many ways surpassed the Amiga.

Quite a lot in those worlds caught my attention, but I had to hunt to find worthwhile developments in the Amiga community. At the same time I watched Amiga developers, distributors, and magazines go out of business. The list is long and painful, and the tale has been told before. The number of Amiga developers who could be counted as true successes is small, and most of them diversified with development on other platforms.

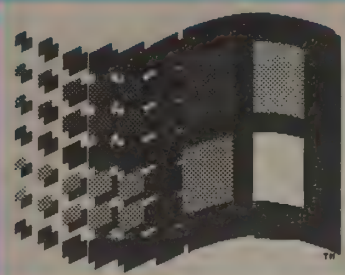
I too diversified. I bought a computer that was not an Amiga. I've still got my 3000, but it gets less and less use over time. I'm still waiting for Commodore to set a standard for 24-bit display cards. I'm still waiting for Commodore to figure out how to advertise the Amiga. I'm still waiting for decent, affordable, and reliable networking software. In short, I'm still waiting for the Amiga to be a success.



Copyright © 1992. All rights reserved. Matthew Leeds has been involved in the high-tech field since he blew up his bedroom playing with a children's chemistry kit. He has been using Commodore computers since 1982 and has a strong interest in photography, video, graphics, and related fields.

Continued on page 150

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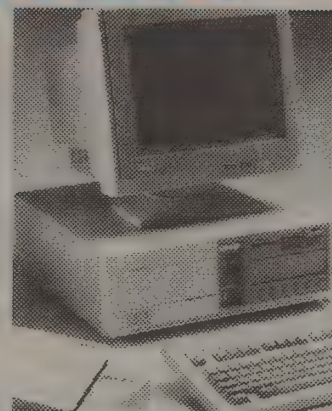
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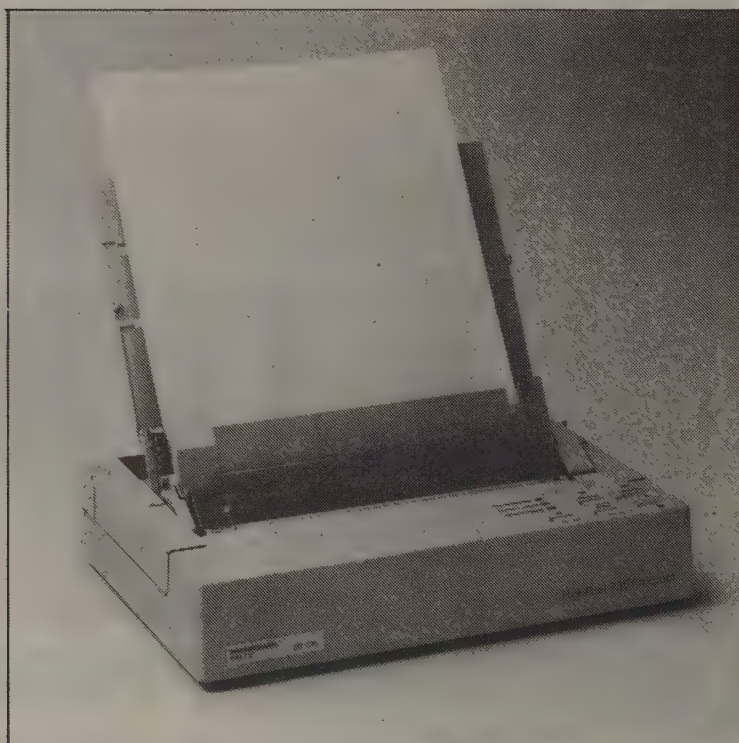
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Exceptional Quality For Portable Printing

The MT735 From Mannesmann Tally Sets A New Standard For Printing Documents When You Are Away From The Office

BY ED
KAHN



Portable printers are nothing new, they've been around for several years. But, until now, there has almost always been something to remind you why you looked forward to returning home to that faithful, desktop laser printer. Well, there is finally another choice. While not inexpensive, it really does offer laser printer quality—although not laser technology—and all of the other features you demand.

Mannesmann Tally's new MT735 is in a class by itself. The company has targeted this printer at professionals who require laser-quality output and speed at off-site locations. This printer, weighing just over 8lbs., works at six pages per minute and has a built-in cut-sheet feeder that holds close to eighty sheets of paper. It uses thermal transfer technology giving its best results with high-quality smooth papers, although it will work with standard copier paper.

There is a lot to be excited about with this printer. The overall size of the unit is roughly 8.5" x 11" x 2." There are no separate pieces to assemble, although there is a metal grill that holds the stack of paper in place, but it is not essential to the operation of the printer.

There is also a power supply that can run the machine or recharge the built-in nickel cadmium battery. For most printing jobs, the batteries are sufficient—about 150 pages can be printed on a fully

charged battery. A test program that can be printed at start-up creates a graphic showing the battery life so you can estimate whether the remaining power can complete your current print job. If you work mostly in the field and return to your home base at night, you will probably never need to carry the charger with you.

The design of the unit is complex and a little difficult to figure out from the documentation. I was, however, able to load paper and get everything in running order before I needed to consult the instruction manual. To actually make the printer work, I had to revert to the tried and true rule of, when all else fails, read the manual. This printer is really an engineering marvel. Closed it looks like a rectangular box, but by pushing buttons and pulling on pieces of plastic, when it is fully unfolded, it looks like a conventional printer with paper stacked at an angle against a support.

Before you use the printer the first time, you have to go inside the box and set two banks of dip switches. These configure the printer for the emulation of your choice as well as tell it whether you are using legal, letter, or A4 (European) size paper.

One of the real beauties of this printer is that it has four printer emulations from which to choose. In practical terms, this means that you are not dealing with an oddball configuration. For me, using the HP LaserJet Series II means that I can use the same printer driver at home and in the field. I use a real LaserJet III as my desktop printer and the Mannesmann Tally printer worked flawlessly for most applications with that driver.

Other emulation options include the Hewlett-Packard DeskJet Plus, IBM Proprinter X24, and Epson LQ850. The 1MB of memory included with the machine allows you to print graphics and download fonts in the HP LaserJet emulation. And finally, there are fourteen resident fonts.

This is a sophisticated printer. There is a built-in memory of the last page printed. The purpose of this feature is to allow you to make multiple copies of documents. By pressing the copy button on the top of the machine, additional copies are spewed out.

The MT735 utilizes a thermal transfer technology, but has a ribbon that is the full size of the paper. It is a single-pass ribbon, so it always makes a perfect print. Because the ribbon is full paper size, users working with sensitive material must be careful when disposing the spent ribbon, it contains a full record of everything that has been printed. Thermal transfer not only makes beautiful prints, but also allows you to control the density of the finished copy. The control panel has a switch offering three different density settings to give you additional control. This feature is especially useful as you switch

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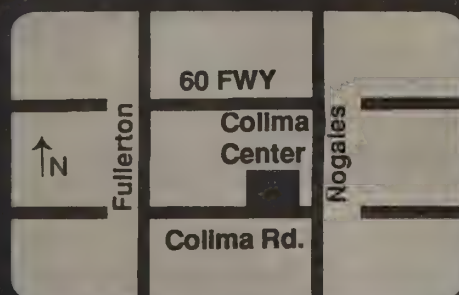
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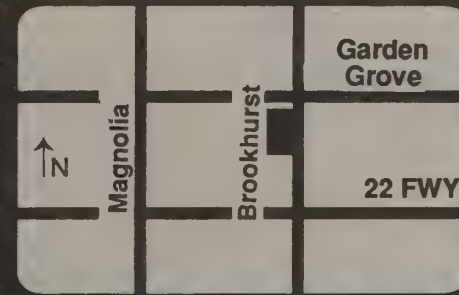


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— Summary from **PC** April 1992



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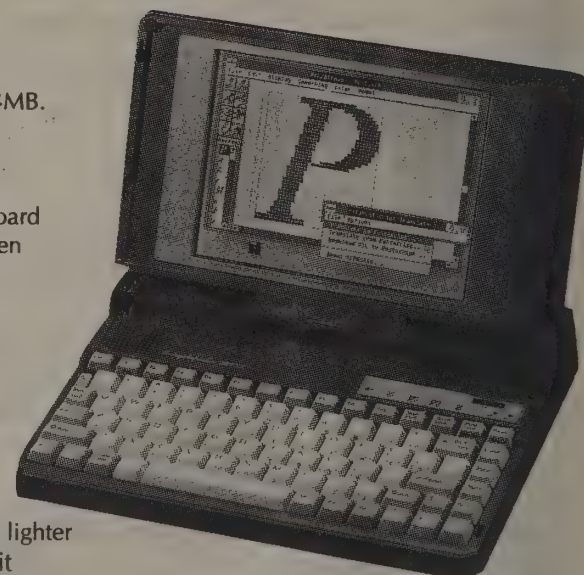
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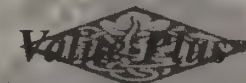
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- ◆ 1 parallel, 2 serial & 1 game ports
- ◆ Super VGA adapter w/1MB
- ◆ 14" 1024 x 768 color Super VGA monitor (.28mm)
- ◆ 101 key click keyboard
- ◆ MS DOS 5.0, MS Windows 3.1 & serial mouse
- ◆ VP-932 Phone Card

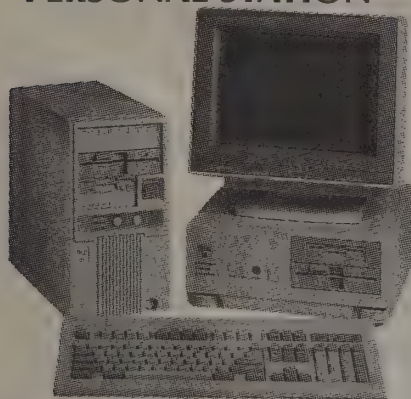
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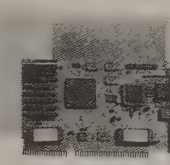
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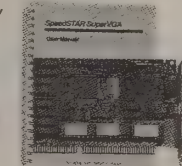
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- Extended graphics mode drivers for popular applications like AutoCAD, Lotus 1-2-3, Microsoft Word, Microsoft Windows, WordPerfect, CADKEY, DATACAD, and VersaCAD



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ViewSonic Monitor 17"

Non-interlace & Low Radiation

"ViewSonic had perfect sizing and superb peripheral focus; it received a near-perfect score on our color-matching scale."

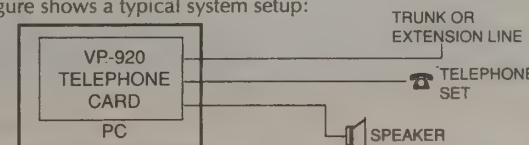
-Infoworld Product Comparison

Value-Plus Office Automation



VP-920 Phone Card

The VP-920 PC Phone System is an IBM PC based telephone message processing system designed for personal and business use. When connected to a phone line either directly or through a private phone system, it provides the following five functions: Voice Mail, Telemarketing, Phone Book Dialing, Auto-recording and Voice Memo. These functions are tightly integrated in a user-friendly environment where the power of computer and communications become one. The following figure shows a typical system setup:



from one quality of paper to another. Another advantage with the MT735 over real laser printers is that there is no warm-up time so the first page comes out almost immediately.

Every aspect of the design of this machine has been well thought out. The ribbon will last for about the same number of prints as the battery. This means that everything runs out at the same time. Ribbons cost \$75 for a set of five. This all translates to a cost of about ten

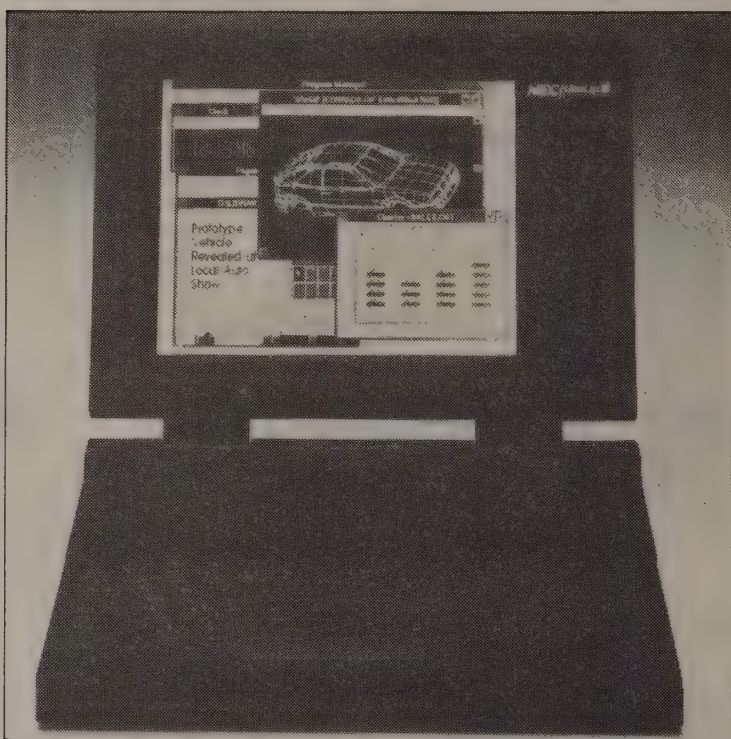
cents per page.

While the battery can be recharged anywhere in the world, it may be necessary to buy a European power supply (\$38).

A final option is a carrying case, which has a suggested retail price of \$60. If your budget can handle this machine, you will certainly be pleased with its capabilities and performance. This is the portable printer to put on your wish list. ■

Computer Of The Month

NEC's UltraLite III



want to attach a full-sized keyboard, there is a port available for either a PS/2 keyboard or a mouse. You must, however, buy a special Y cable if you want to use both of these input devices. In the interest of space, the port was designed to only work with NEC's special adapter cable. NEC offers another option—a ten-key numeric keypad (\$129) that, when attached to the computer, gives a nearly full-size keyboard.

NEC recognizes there are tradeoffs from using such a small machine and has designed a docking station (\$899) to remove most of the undesired effects. With the docking station, the system weighs close to 15lbs. It is interesting to note that only a few years ago, that was about the same size as a standard portable computer. The docking station has room for one full-size or two half-size AT cards, and will hold a 5.25" drive.

The battery pack that fits inside the UltraLite III only gives about

Over the years, NEC has stuck with the same basic design while modifying the machine to keep up with the most advanced technologies available. Their newest incarnation, the UltraLite III, is a pleasure to work with and resolves most of the complaints associated with the earlier versions.

two hours of power. You can buy extra battery packs (\$109) or a battery slice (\$269) that will give you up to five hours of battery operation when coupled with the internal nickel cadmium battery.

The documentation that comes with this unit is thorough and excellent.

I really enjoyed this computer. Everything worked to perfection. If weight is a major consideration, then this is certainly a computer to check out. NEC has packed about as much as is possible into this small unit. The real question is whether the tradeoffs are worth it for your needs. ■

The first small notebook computer was the UltraLite from NEC. While ground breaking, it had serious shortcomings.

Over the years, NEC has stuck with the same basic design while modifying the machine to keep up with the most advanced technologies available. Their newest incarnation, the UltraLite III, is a pleasure to work with and resolves most of the complaints associated with the earlier versions.

The UltraLite III features a 20MHz, 386SX processor and has a 60MB hard drive. The complete package weighs 4.8lbs. and measures 9" x 11.5" x 1.5". In order to get so much packed into such a small space, they designed an external 1.44MB, 3.5" floppy drive that connects to the right side of the computer and can be left behind or packed away separately from the computer. This configuration works well. The drive itself is small and lightweight. The computer itself comes with MS-DOS 5.0, Windows 3.0, and 2MB of memory, expandable to 10MB.

The 9.4" LCD display offers a clear VGA display. If you need color, you can attach a VGA monitor to the video port on the back of the unit. The monochrome LCD handles thirty-two shades of gray.

The keyboard on the UltraLite III has seventy-eight keys. The general layout is pretty much what you would expect in such a small unit. With a computer as thin as this, it is not unreasonable that the keys do not offer full travel. However, you must use two keys to access PgUp, PgDn, Home, and End. Other lightweight notebook computers have arranged their keyboards to avoid this inconvenience. If you

RESOURCES:

UltraLite III, \$2699
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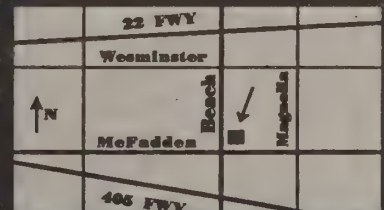
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Freedom From The Floppy

Diskless Workstations On A LAN Can Improve Your Company's Security, As Well As Save Money And Time

**BY PETER
JOHN
HARRISON**

The intruder approaches his target. Assisted by a careless employee who has forgotten to sign off, he copies vital company information to a floppy disk and makes his exit, unnoticed...

O.K., I'm being melodramatic...but that doesn't mean this scenario is pure fiction. Computer security in the age of LANs is a real concern, and individual PCs on the network can become a security nightmare. Through seemingly innocent disk drives, uninvited guests can gain access to confidential corporate files and take them off-site; employees, unaware of the damage they may cause, can introduce harmful computer viruses while copying a "pirate" version of their favorite word processing program (or computer game) to the system; and other employees may violate your software licensing agreements by copying company software for use at home.

Workstations that boot from disk have other liabilities, too. Updating the network drivers, DOS versions, and other software required at start-up can be a major hassle—particularly where workstations are inaccessible. Downtime caused by damaged or misplaced diskettes and periodic failures of the drives themselves always seems to occur at a bad time, forcing deadlines to be missed and the productivity of LAN users and administrators to plummet.

Given, then, that booting from disk can be a hassle, and most LAN users don't need a floppy or hard drive to get their work done anyway, why buy workstations with disk drives?

Novell NetWare and Microsoft LAN Manager both support diskless workstations, which read their boot instructions from a chip plugged into the network interface card and a boot image file stored on the file server. And, contrary to what most people expect, setting up a diskless workstation is pretty easy, provided the network interface card used has a socket for a boot ROM.

Recently, I bought seven 386SX PCs and set them up as diskless workstations. Five of the workstations came with Intel TokenExpress cards and boot ROMs, the other two I equipped with Proteon p1390 network cards I removed from older equipment and boot ROMs I ordered with the workstations.

Getting the five TokenExpress-equipped workstations running was a quick, easy process. After setting the DIP switches on the TokenExpress card (Intel has excellent instructions on what settings to use), I created separate boot diskettes for each workstation, just as I would have if they'd had disk drives. Then, while signed on as a "supervisor," I ran Novell's DOSGEN utility to transfer the contents of each diskette to separate boot image files in the file server's LOGIN directory. The network also needs to know which boot image file goes with which workstation, so I used EDLIN (any ASCII text editor would work just as well) to create a BOOTCONF.SYS file listing each card's ID number (displayed on the computer screen by the TokenExpress card when the workstation is turned on), the name of the network the workstation would be attached to, and the name of the boot image file to use for that workstation.

After doing this, all I had to do was plug the workstations into the network, an electrical outlet, and turn everything on—all five of them worked immediately. From start to finish, each workstation took about twenty minutes to configure.

The Proteon p1390 cards, however, were a different story. After several attempts to configure these cards, I called their technical support number. My problem was simple—I was using older IPX drivers, and needed to download the current driver software and incorporate it into the Proteon workstation boot diskettes. Once I had the current drivers, setting up the two remaining workstations went smoothly: I set the jumper pins according to the instructions, used the downloaded driver files to build IPX drivers to match my card's settings, updated my boot diskettes with created boot image files, and added the new workstations to the BOOTCONF.SYS file. With the new drivers in place, the remaining two workstations appeared on the network with no problems.

Outdated drivers are always a good place to start looking when you're having problems adding new equipment to your LAN. It's not a sure cure for trouble, but since most network card vendors let you dial-in and download their current driver software for free, it won't cost you much time or money to stay current. So, if you're converting older cards

Outdated drivers are always a good place to start looking when you're having problems adding new equipment to your LAN. It's not a sure cure for trouble, but since most network card vendors let you dial-in and download their current driver software for free, it won't cost you much time or money to stay current.

for use in diskless workstations, you might want to plan on updating your drivers before you create the boot disk, and possibly save yourself some aggravation later in the game.

Diskless workstations not only help keep your data safe, they cost less, have fewer mechanical parts to wear out, are easier to maintain (especially true for workstations in locked offices or at other locations), and are less attractive to thieves. (Who wants to steal a computer without a hard or floppy disk drive?) Workstation users like them, too, because there are no disk drives to whine, grind, or whir.

Anytime I can save money, improve security, and reduce long-term downtime, I'm happy. Going diskless is a great solution anywhere you need a workstation, but don't need a floppy or hard disk to get your work done. ■

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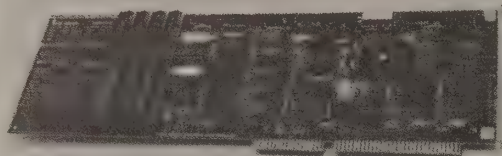
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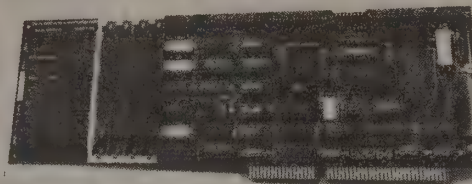


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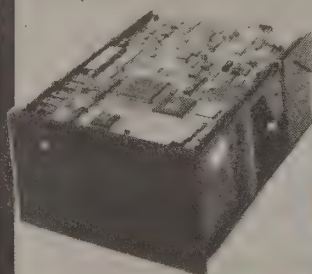


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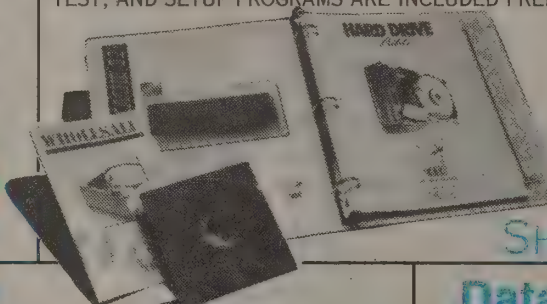


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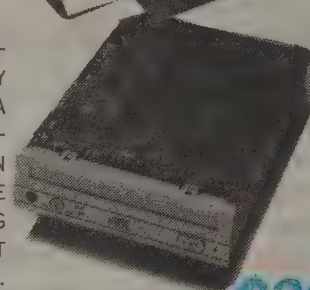


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Building A Hybrid Network With 10BaseT

Part 2

BY WAYNE A. YACCO

A lot of big installations are using MiLAN's Alternet to keep their networks from turning into the Gordian Knot of cabling. As I promised last month, this column continues with the details on Alternet, and the explanation of how retiming limits the number of concentrators and other repeaters on a network.

THE PROBLEM REPEATERS SOLVE

Repeaters provide a simple way to join segments into larger ones. They increase the size of a segment by renewing packets of data, and passing them along. To renew packets, repeaters boost signals, and they retime them. They retime signals to prevent jitter (which is

with today's technology.

All varieties of Ethernet require repeating if the length or capacity limits on a segment are exceeded. For instance, thinnet's overall limits are 185 meters and thirty nodes, and the maximum distance between node pairs is 50 meters. To go beyond that, you need a repeater to boost the signal. Hubs are simply multiport repeaters, and they repeat the signal from each node's segment before passing it on to its destination segment. The restrictions that apply to cascading, or interconnecting, of hubs on 10BaseT are, therefore, the same ones imposed on any repeater.

THE CHEATER REPEATER

As I mentioned last month, it is possible to directly convert thinnet to UTP with a gizmo made by MiLAN. Alternet

turns thinnet into UTP like a concentrator does—by repeating its signal. However, it lacks a real repeater's retiming circuitry, and won't use up any of the repeater budget. Of course, that makes it likely that jitter will accumulate if two Alternets are connected back-to-back (except over very short wire runs). But within its two-segment limit, Alternet is a simple and inexpensive solution.

Alternet works, says MiLAN Marketing Manager Dan Eakins, because every 10BaseT segment normally goes right into a concentrator, and a concentrator's retiming corrects the segments plugged into them. "The IEEE says every time you extend or convert media, you have to retime it, but with 10BaseT, every hub is already doing the retiming," claims Eakins. "So, you don't have to retime just to repeat between two segments if one is connected to a hub."

He says the IEEE spec is less tolerant because it was written for thicknet, not 10BaseT: "The IEEE has not recognized that jitter is a different problem than it was ten years ago." Some very connectivity-savvy companies have apparently recognized the difference. Eakins says some have ordered over a thousand Alternet converters.

So, although it doesn't conform to the IEEE Ethernet spec, Alternet works fine, because it's connected to a hub, and the hub corrects

More-Twist is a 10BaseT extender that can add an extra hundred meters, doubling the length of 10BaseT segments. Like Alternet, it does not correct timing, but it doesn't reduce the repeater budget either. If you put one between every repeater, it could effectively double your budget.

LOCAL AREA NETWORKS

the phenomenon of packets moving "out of frame," or arriving a little earlier or later than they should) from accumulating over multiple segments. If these timing errors were allowed to accumulate, it would quickly become impossible to distinguish between zeros and ones.

THE PROBLEM REPEATERS HAVE

Retiming, though necessary to correct jitter, also introduces delay. The delay is what limits the number of repeaters that can be cascaded. The total number of repeaters between the two most distantly separated nodes on an Ethernet network must not introduce more than ten microseconds delay (the end-to-end transmission delay).

Within a segment, the number of devices that are allowed depends on the speed with which they perform their retiming chores; that limit is referred to as the "repeater budget." "The rule of thumb is no more than three levels of repeater cascading," says MiLAN's marketing director Dan Eakins. "After that you need a bridge." (Bridges correct the delay by isolating the timing of the segments they join.) The documentation for Shiva's Hublet (see last month's column) suggests that four repeaters is the outermost limit



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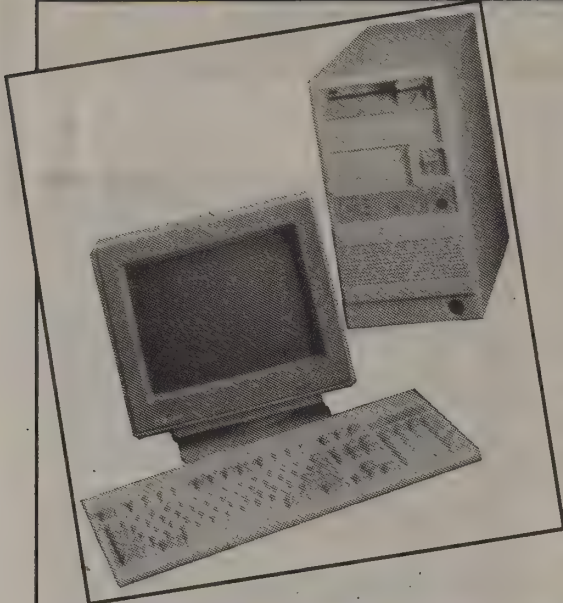
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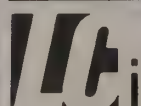
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the jitter before it becomes significant. MiLAN makes gadgets that will take you almost any-Ether-where with this design. More-Twist is another useful example: a 10BaseT extender that can add an extra hundred meters, doubling the length of 10BaseT segments. Like Alternet, it does not correct timing, but it doesn't reduce the repeater budget either. If you put one between every repeater, it could effectively double your budget, and that's something you can put in your repeater pocketbook.

Next month, I'll look at another hybrid-network product: one from Tutankhamon Electronics that was developed specifically to overcome Ethernet limitations. The king's minions say it increases reliability and distance while reducing the required number and quality of wire pairs!

DOING THE MOBIUS STRIP

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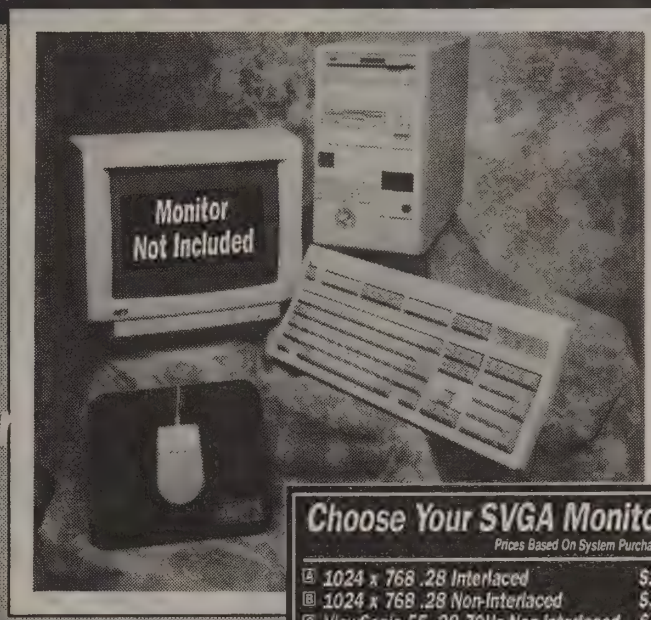
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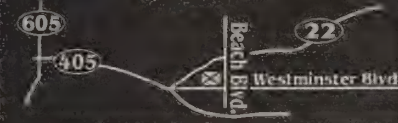
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SE/30 systems as well.

With only a single slot available in either, the LC and SE/30 have the most to gain. But the compact Mac machines, while great for saving space on the desktop—not to mention saving a few bucks—put the squeeze on you, too, when it comes to expansion. I also work with an IBM PS/2 model 80 and several AT compatibles, and I've managed to feel cramped even with eight slots. It reminds me of the adage that says work expands to fill the

available time. Perhaps, there should be another adage that says expansion needs grow to fill the available space.

Of course, networks add to the bus crush by adding another card to every machine. So, I was really delighted when Mobius sent one of their NuBus systems for the IIcx I use. Mobius basically put a video controller on a network interface card (NIC) with both thin and twisted-pair Ethernet connectors. I simply stripped the old cheaper-net out of the cx,

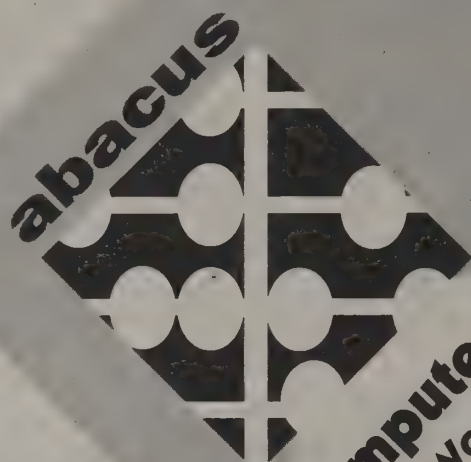
popped in the Mobius adapter, swept some stuff off a shelf, and replaced it with the Mobius 19" monochrome monitor. Since I didn't have to give up a slot, the system's NEC 4D continues to provide low-cost color. The Mobius display adds enough space to open many additional windows. More importantly, however, it gives you access to very large windows. You can use it for side-by-side documents.

Mobius makes it easy to install and use the Ethernet Display System. Support is fairly busy, but toll free (and they do call back). The documentation is well illustrated, and the installation software includes EtherTalk Phase 2, an Ethernet driver for the display system, and AppleTalk 56.0. A single jumper must be set to select between the RJ-45 connector for 10BaseT and the BNC connector for Ethernet. (A pair of external lamps confirm the type and connection status at a glance.) The Mobius Installer did assume that it was the only display and reset my color, but a quick trip to the Control Panel had it back in a click. One boot later, and I was whipping the cursor up and down between screens like a maniac. Hey, it's fun.

It's fun to use too. I've worked with an MDS Genius full-page display on PCs, and it's great. However, the Mac adds an extra dimension, not merely because it displays pages side-by-side, like they'll appear when printed, but because you can move windows between them without special support in the applications. In fact, you can drop a window right on the border with half hanging in each display if you want.

For instance, by designating Mobius as the primary display (you merely drag the title bar to it in the control panel), it is possible to make PageMaker fill the entire screen with two full-size pages. It then takes but a single click of the mouse to simultaneously move the screen to the color monitor, and resize it to fill the smaller screen exactly. You can do layout on the Mobius with full view of tracking and dynamic balance across a complete spread, then instantly switch to the 4D to work on separations or other color detail.

The Mobius Ethernet Display System really helps Mac users add another term to the group-publishing equation. It costs a fraction of what two-page color would cost, and it includes an NIC. Furthermore, the monitor is significantly smaller and lighter than a color unit of the same dimension. It's easy on the eyes too: The resolution is 1024 x 826 (75dpi), and it has a 75Hz vertical refresh rate. For more space on your NuBus, more space on your Mac desktop, more space on your hardwood desktop, more space on your network, and more just-plain personal space, this is the way to go. Wow, I'm spaced out. ■



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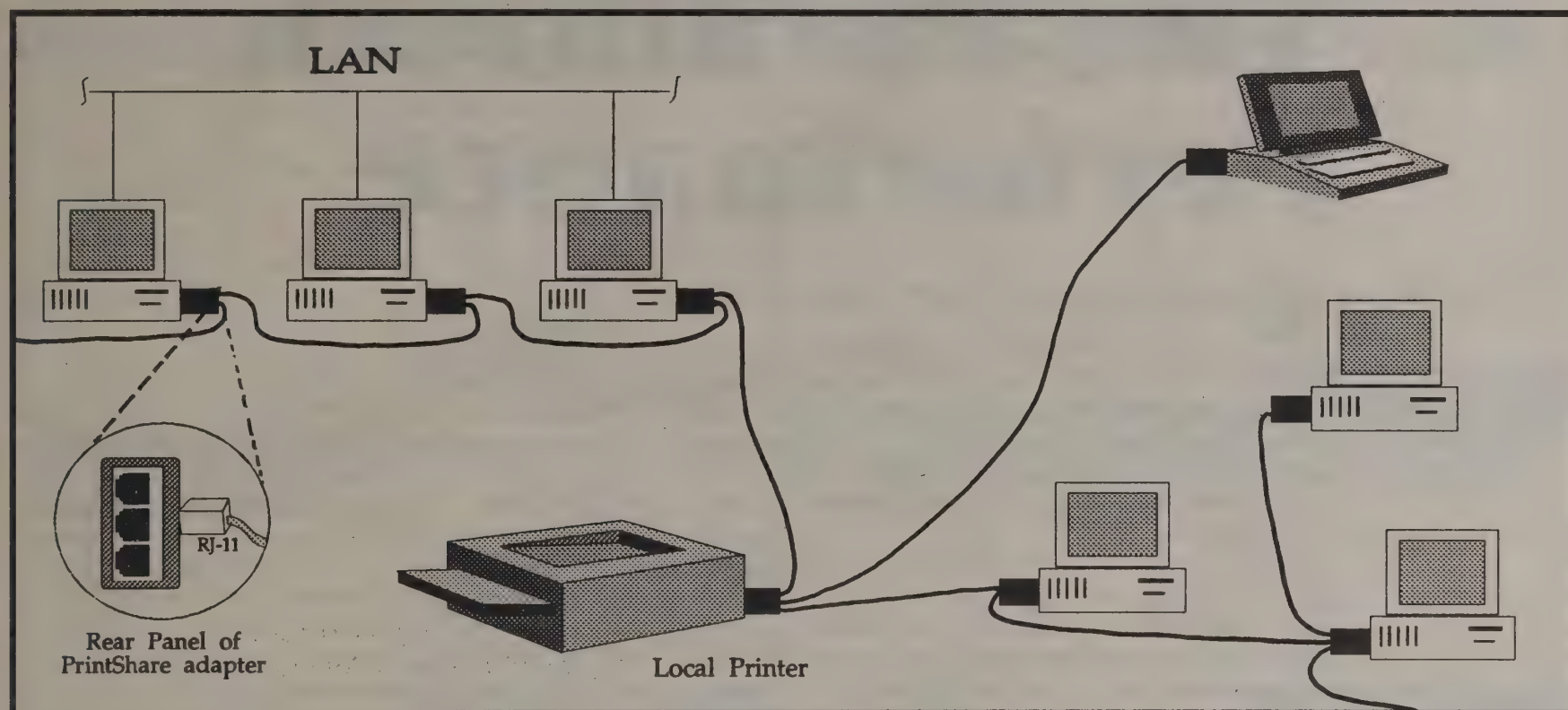
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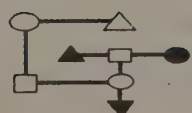


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The Paradox Of Performance

Lunch With The Gurus

BY BENNETT FALK

The gurus, in sun hats and dark glasses, were seated around an outdoor table at a restaurant in Emeryville indulging their fondness for radicchio and Chardonnay. The waiter had just begun pouring another bottle when someone's beeper went off. The diners looked at their waistlines and then at each other until the guilty party was found.

The bearded Baba poked at the little black box attached to his belt and squinted at the number displayed there. He reached into his jacket pocket, pulled out a small cellular phone, and dialed a number.

"Yo, what's up?" he asked presently. Conversation around the table stopped while the bearded guru talked on the phone.

Aware that he was the center of attention, he covered the mouthpiece of the phone and explained to the other gurus:

"They're putting me through to somebody reporting a performance problem with an application program, a database of some sort."

UNIX

ILLUSION? PERHAPS...

The waiter, a balding penguin-shaped man in black trousers and white shirt, cleared his throat and ventured a comment. "Has it ever occurred to you that the vagaries of computer performance are illusory?"

All the sun hats and dark glasses turned to face the waiter, taking in his perfect posture and excessive decorum. He continued:

"Put simply, any computer consists of three parts: a processor to execute commands; some amount of memory that serves as high-speed, short-term storage for the processor; and some amount of disk storage which holds larger volumes of data on a medium much slower than memory. Each of these components has a fixed speed; that is, each component can do only so much work in a millisecond or a second or a minute, and in fact, unlike a car or a human being, each component always works at its designated speed. It has no choice. Strictly speaking, the computer's performance is constant.

"On occasion, the performance of a program on a computer may vary from one running to the next, but this is not because the disks, memory, and CPU run slower at some times and faster at others. Since the computer's speed is fixed, I suggest the apparent variations in the running of programs are nothing but an illusion."

YES, BUT...

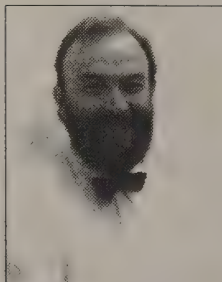
Baba, still holding the cellular phone, peered over his sunglasses at the waiter. "I suppose," he said, "that if your program ran on a single-user computer incapable of multitasking, the performance of the program would be more or less identical with the performance of the computer. Both would be constant, and you might be less sensitive to

performance variations.

"But in a multiuser situation the performance of a single program can suffer because the computer's resources are shared among all the users at any given time. The degraded performance has one easily measured symptom: the program takes longer to run. The elapsed time for a program stretches out as it competes with other programs for CPU or memory or disk. It certainly doesn't seem illusory to me."

The waiter was unmoved. "Of course it doesn't seem illusory, but is it not the case that when a program takes longer to run, it is because more work is being done, either by the program being measured or by some other program running at the same time?"

"On occasion, the performance of a program on a computer may vary from one running to the next, but this is not because the disks, memory, and CPU run slower at some times and faster at others. Since the computer's speed is fixed, I suggest the apparent variations in the running of programs are nothing but an illusion."



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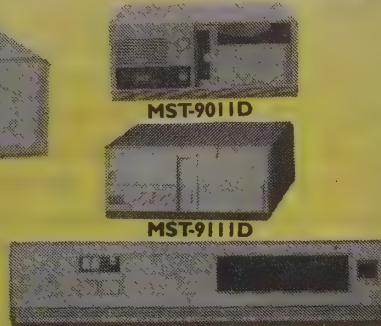
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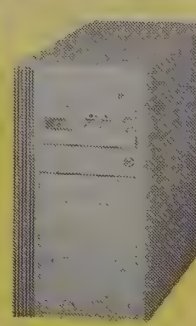
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"Not necessarily," chimed in another of the gurus. "What if there's a bottleneck?"

"Bottleneck?"

"Yes, bottleneck. You described a computer with three parts: processor, memory, and disk. What if one program used so much of one of those resources that no other program could proceed? There's a good chance that whoever is on the other end of Baba's phone will report that they have one process using up 85% (or more) of the processor's cycles and no one else can get any work done. Surely that's a performance problem."

**"Don't most people
avoid bottlenecks by
doing something
creative with
hardware? The simple
solution is to add more
disk, memory, or
processing power. But
even without adding
more hardware, there
are clever ways to
convert one hardware
resource into another."**

"Well, that might be a scheduling problem, but since the machine's performance has to be constant, I'm not convinced it's really a performance problem."

The waiter slipped into a more relaxed posture. "In fact, look at the kinds of things that are done to relieve bottlenecks. Don't most people avoid bottlenecks by doing something creative with hardware? The simple solution is to add more disk, memory, or processing power. But even without adding more hardware, there are clever ways to convert one hardware resource into another. When the demand for memory exceeds what is physically available, disk space can be treated as an extension of memory and whole processes are swapped back and forth between memory and disk. Similarly, material read from disk is often buffered in memory to save on time-

consuming disk accesses.

"Regardless of how we divide things up, however, any particular hardware configuration will always run at only one speed."

THE PERILS OF IDLENESS

The bearded Baba sighed heavily. "This business about the machine running at a fixed speed is bothersome. Maybe you don't have to shift gears on your computer to get up to speed, but there's a big difference between running at a fixed speed and running at capacity."

"Oh?" the waiter arched an eyebrow. "And what might that be?"

"Well, technically," the bearded guru continued, "it's the percentage of time the disk or the CPU is idle. Take the disk, for example, it's either doing something or it's not. If there's nothing that needs to be read or written, we say the disk is idle; when there are lots of read or write requests, there may be long periods of activity between spurts of idleness. In general we can measure (with UNIX commands like 'iostat' or 'sar') how much time a disk spends being busy or idle, and we can turn those measurements into a percentage of the disk's capacity.

"You've already pointed out that the disk can't exceed its capacity, so when the disk is already working at capacity and we ask it to do even more, it will just take extra time to process all the requests."

At the other end of the table, another of the gurus became agitated and started babbling about "head contention on a hot spindle." A distinguished-looking man at a nearby table glowered disapprovingly at this outburst and tried to signal the waiter, who ignored both these distractions and addressed the gurus nearest him:

"But surely this proves my point that variations in performance are illusory: the 'percentage of capacity' measurement depends entirely on the period of time over which capacity is measured. If we were to measure the performance of a disk once a second and if the disk were busy for one second and idle for four, what percentage of capacity should we assign to that? From the fact that at any given instant the computer is either doing something or doing nothing you want to infer performance gradations. But the gradations all depend on the time period over which you take measurements. How can you trust anything so, well, malleable?"

"Hello, Hello," a tiny voice buzzed from the speaker of the cellular phone.

The bearded guru put the phone to his ear and listened for a few seconds, periodically making noises indicating comprehension. "Have you considered the possibility," he said, "that this might be an illusion?" ■

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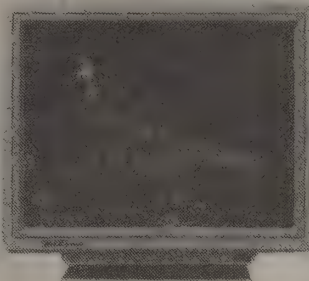
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Quality Is Alive And Well In Milpitas

Baldrige Award Winner Solectron Sets The Standard For Manufacturing

BY MARY
EISENHART

"This country has been losing ground in manufacturing in the last twenty years, so we want to revitalize American manufacturing competitiveness."

—Winston Chen

For the last few decades, US manufacturing has been in decline, and nowhere is this more evident than in the computer industry. For a myriad of reasons, from high costs to quality control to Byzantine tariff restrictions, a large number of vendors have given up their domestic manufacturing operations and moved offshore.

In 1987, as part of an effort to boost US competitiveness in world markets, Congress established the Malcolm Baldrige National Quality Award in three categories: manufacturing, small business, and service. Previous winners have included Motorola, Xerox Business Products, Cadillac, and Federal Express. Last year Solectron Corporation, a fourteen-year-old manufacturing company in Milpitas, became the first Bay Area winner of a Baldrige award.

Solectron got its start in 1977 repairing Atari video game systems and rapidly moved into the board-stuffing business. As the industry evolved, Solectron prospered; as pricing became competitive and product life-cycles shorter, an ever-growing number of vendors found it more cost-effective to focus on their strengths in innovation and marketing and contract the actual product assembly to specialists like Solectron. Today Solectron's customers include such industry leaders as IBM, Apple Computer, Hewlett-Packard, Sun Microsystems, and Silicon Graphics, as well as companies involved in such fields as avionics and medical imaging.

Currently chairman and co-CEO, Winston Chen served as president of Solectron from 1978 to 1990. A native of Taiwan and first in his class in the civil engineering department at National Cheng Kung University in that country, Chen received a Ph.D. in applied mechanics and mathematics from Harvard University. From Harvard he went on to work for IBM in San Jose, as manager of printed component integration and manager of tape

PHOTO: PAUL WINTERITZ



"Our customers focus on front-end design, product introductions, marketing, finance, and we support them on the manufacturing side."

head technology, before moving to the startup Solectron. In 1989, Chen's former boss at IBM, Koichi "Ko" Nishimura, joined Solectron as COO. He now serves as president, and the two men share the CEO responsibilities.

Chen sees company-wide obsession with quality as the key element in Solectron's success. Manufacturing processes incorporate the best qualities of Japanese and American techniques, from just-in-time manufacturing to a strong sense of individual responsibility for the product—e.g., if something's not right, any employee can stop the production line and fix the problem. Solectron surveys its customers weekly in order to monitor their satisfaction level, which appears to be pretty high—their on-time delivery rate is 97.7%, and defect rates have fallen to 233 parts per million. That's not good enough, though—they're aiming at 3.4 ppm by 1994.

None of this could have been achieved without a dedicated work force, and Solectron invests heavily in its employees, many of whom are recent immigrants who speak over twenty different languages. The company sponsors a program called Solectron University, which includes classes in management training, electronics, and English as a second language; there's a strong commitment to helping employees advance within the company.

Solectron's even exporting its unique manufacturing culture—last year it opened a facility in Penang, Malaysia, which runs according to the same principles as the Milpitas plant.

In March, Chen addressed a meeting of the World Forum, describing his experiences when he accompanied President Bush and various US executives to Japan and other Pacific Rim countries. We were intrigued not only by Solectron's success but by Chen's views on US competitiveness in increasingly global markets, so we visited Solectron and asked some questions.

What do you see as Solectron's mission?

We provide customized manufacturing service to original equipment manufacturers. IBM, Sun Micro, Apple Computer,

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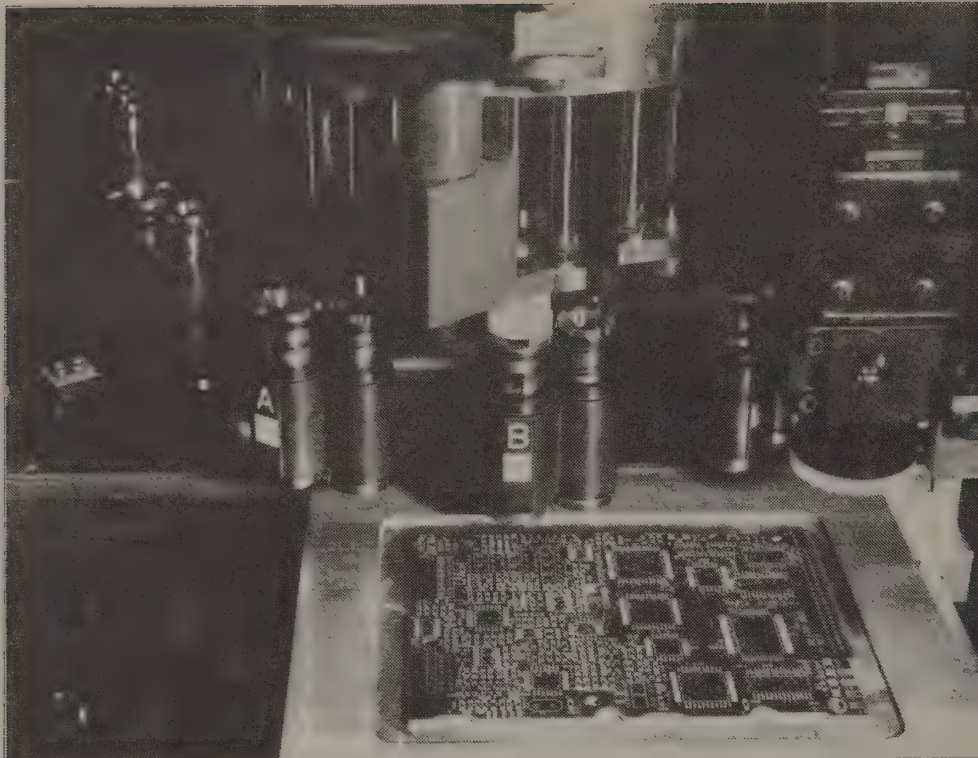
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Hewlett-Packard, Silicon Graphics, emerging growth companies. About sixty-some percent of our revenues come from the service we do with printed circuit boards for these companies, surface mount technology particularly.

What is our mission? Our mission is to try and create one of the best manufacturing companies in the US. Actually in the whole world, because this country has been losing ground in manufacturing in the last twenty years, so we want to revitalize American manufacturing competitiveness.

Do you see that happening across the board, or particularly at the high-tech component level?

Well, we're in the high-tech area so I cannot comment on the rest of the industry. I'm somewhat involved in certain trade and competitiveness issues—our trade deficit last year was still \$65 billion. It's coming down—it was \$100 billion two years ago.

The auto industry trade deficit with Japan is \$30 billion, autos and auto parts. But the electronics industry also had an \$18.5 billion trade deficit with Japan last year.

The Japanese have created a lot of wealth through doing an excellent job in manufacturing. The strength of this country in several areas is in innovation, new product introductions. We're much faster in responding to market need than the Japanese.

We're strong in the area of software, we're strong in airplanes. The Japanese focus on the manufacturing side; they don't mind being second in introduction of new products, but they do a good job in production. Production, I would say generally, is a weak area in the United States, and that's what we focus on.

This company is not a typical Silicon Valley high-tech-product, fancy-sexy type of company. We don't design. We do the grunt work. Sometimes we do the work our customers

don't want to do.

Do you do any design here, or take the customer's specs and build the product?

We do some portion of the design. Of course "design" is a wide spectrum—"design" can start from market concept and go into the whole product, conceptual design through IC design, printed circuit board design, system design. We focus on one portion—printed circuit board layout design. Some of our custom-

ers do their own in-house design, but we provide some service.

But that's not our particular strength. Our particular strength is manufacturing quality. On-time delivery. Good service. We handle a lot of frequent changes.

We are, in many cases, partners of our customers. Our customers focus on front-end design, product introductions, marketing, finance, and we support them on the manufacturing side. So when they finish the design, with our help, many times, they really hand over their manufacturing requirements—"This is the schedule, this is the design, this is the documentation. You buy materials, you manage inventory, you manage assembly, you manage testing." Sometimes we even manage distribution for our customers.

How do you account for the fact that you're so successful while so many other American manufacturers are either giving up or going offshore?

First of all, manufacturing is a tough business. It's tedious—you have to handle millions of details every day. It involves lots of people. It's hard to manage a big organization.

Also, in the typical high-tech company, they focus on innovation, design, marketing. Manufacturing is kind of the bottom of the totem pole. Where we're different is this is a manufacturing company. Manufacturing is our lifeblood, and therefore we focus on it, and we do well.

Our customers, high-tech companies, focus on product design, innovation. Usually they don't pay a lot of attention to manufacturing. Manufacturing people usually get lower pay, long hours, no prestige. But in this case, we're different.

Manufacturing is our number one priority. And we learn the best skills, the best techniques in the whole world, from American

companies, from Japanese companies. And we help our customers by letting them focus on what they do best. Sun Microsystems can focus on their chip design, workstation, software, networks, and we focus on manufacturing techniques. So it's a partnership.

Also we provide a lot of service to large companies like IBM, Hewlett-Packard, Digital Equipment. Our cost structure usually is significantly lower than our customers', because we're a newer company and don't have a lot of overhead. We don't have fancy buildings—my office is there [points to an adjoining cubicle], and Ko's office. It's a democracy.

Cost is very important in our industry. So we can help our customers lower their production costs.

What percentage of your clients are US companies, and what percentage foreign?

The majority up to now still comes from American companies. So far probably 98% of our revenue this year is from the US. Next year our foreign revenue will increase, because we're in the process of globalizing our operation.

We have three thousand people in Silicon Valley; we set up an operation in Penang, Malaysia, about a year and a half ago. It's been in production about a year, and this year we ramp up to \$12 million. Next year it'll be \$30 or \$40 million. In five years, the operation in Asia will probably be several hundred million dollars, because the market is growing quite rapidly there too.

We are working with one of our major customers to acquire their facility in France. If the deal is completed and we take over the facility, we'll have an operation in Europe, and that will create very rapid growth in Europe.

We have nine buildings in Silicon Valley—it's a relatively high-cost area. We focus on the high end of the market, essentially—main-frame computer products, disk drives, midrange minicomputers, workstations. We are not competitive at the low end, like small disk drives. Many of our customers move their facilities to Singapore, to Bangkok, or Malaysia, because it's one-quarter or one-fifth the labor costs here, and it's high volume. That's not our strong area. So the high end is the area we've been focusing on for thirteen or fourteen years, and we've been doing quite well as a company.

But right now we have reached the crossroad that either we stay as a domestic company or become a global company, and we decided to go ahead and expand globally. We set up a facility in Penang, and that's a huge market, actually bigger than the US market; we're also expanding in Europe, expanding in new technology as well as new extended service.

What do you see as the big challenges in that process?

Well, if you look at our history, we're a

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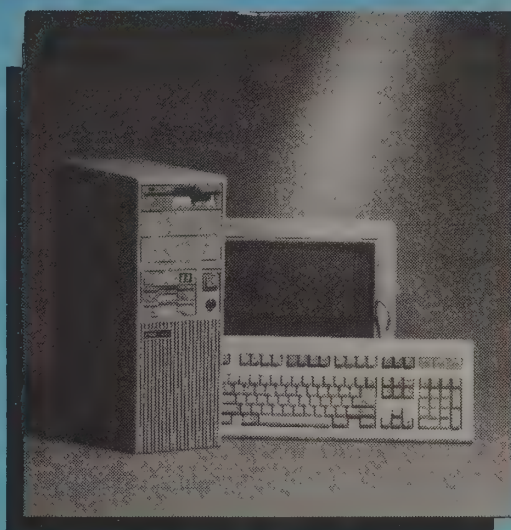
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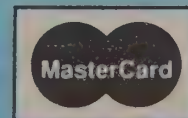
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"Manufacturing is our number one priority. We learn the best skills, the best techniques in the whole world, from American companies, from Japanese companies. And we help our customers by letting them focus on what they do best."

relatively fast-growing company. This fiscal year, in the first six months, we grew about 90%. During a recession. Six months.

And at this kind of a growth rate, it's plenty busy, and we've got to make sure we continue to provide excellent service to our customers, maintain our quality, maintain our corporate culture. Basic values: focus on customer service; respect for our employees, helping them grow; quality, business ethics; create shareholders' value; create value for the community. When we grow in different locations, the challenge is, how do we continue to reinforce this basic value? Customers—how do you keep them happy all the time?

This company has a very unique culture. We all work very hard. We all care, to a great extent, about customer satisfaction and employee satisfaction. When we duplicate our system in Asia and Europe and the East Coast of the United States, can we have consistent value locally? It remains a big challenge for us.

Do you see the customers in the different markets wanting a different kind of product, or is it essentially the same thing around the world?

Absolutely not. We have about 80 customers. Our customers come from the workstation market, they come from the communications market, personal computers, low-end disk drives, mainframe computers.

In each segment, generally the requirement is very different. At the low end, cost reduction is so crucial, because they're in a low-margin commodity type of market. At the high end, it's quality, reliability, service—and their customers are willing to pay for it. At the low end, customers are not necessarily willing to pay for extra quality and service.

So we have to tailor our service to satisfy

each different customer. We're a customized manufacturing service business.

A lot of clone dealers are in the situation where they're in a really low-margin, price-sensitive market, and yet if they cut prices beyond a certain point, the quality disappears and their customers don't come back. How do you handle that tradeoff?

In business, you have to choose your strategy. The conceptually simple form is "Do you want to run a company like Wal-Mart, or do you want to run a business like Neiman-Marcus or Nordstrom?" They're in a different business. You cannot say, "Well, I'm going to provide Nordstrom service at K-Mart or Wal-Mart's price." It's impossible.

So what we decided to do in the US is to focus on the high-end, Neiman-Marcus type of service. We provide extra value to our customers, by providing better quality, faster delivery, and closer service so we can respond to their market changes. Flexibility. Reduce the cycle of time, reduce the inventory. And that added value can justify the higher cost.

At the low end, we cannot do that. At the low end, there's a significant cost differential between here and overseas, so we cannot continue to cut the costs and still meanwhile maintain competitiveness. So in the US our strategy is that when the price is too low, we won't go into that market. We don't participate a lot in the clone business.

Overseas is different. We pick a location—Penang, Malaysia—that has a very good infrastructure, and the cost today is still relatively low. Labor is about \$1.30 an hour—good workers, good management teams there.

So the idea there is we have excellent quality, because we duplicate the system here. We train the people there asking them to spend some time here and learn the system, then set up a system in Penang and meanwhile maintain the low cost there. I think there is a big potential for low-end types of products, clones, PCs, and disk drives, in Penang.

Is your management there local?

Yes. We hired and assembled an excellent management team. The general manager is a local. We sent a senior vice president from here to assist him, but eventually we'd like to have a very independent business.

This company really provides lots of intrapreneur environment, lots of intrapreneur opportunities for our people. How do we do it? We divide our company into smaller divisions. There's approximately ten divisions in the company. This year we'll be doing maybe \$380 million in sales in ten divisions, and they can manage their own operation, service their own companies. They make as many decisions as possible at the divisional level. And also we let them share the profit—last year approximately 20% of our profit was distributed to the divisions.

Also many people in the company participate in stock ownership programs—several hundred people in the company own stock in Solecron.

When you went on the trip to Asia with President Bush, this was a result of the Baldrige Award?

Yes. This was the first time an American president took a business delegation team along with him. In the past our national priority was the Cold War, the Soviet Union. Luckily, those days are over. But most of the rest of the world puts the economy as its top priority, trade and competitiveness as a national priority. Not us, before.

But this is the right time for us to address this issue, so the president invited twenty-one business executives, including three Baldrige winners—Bob Galvan, the former CEO of Motorola, and Ray Marlow of Marlow Industries, a small company and winner of the Baldrige award last year, and Solecron.

I gather from your remarks elsewhere that you saw some difference between what the auto industry guys had to say and what the high-tech guys had to say, with regard to dealing with Asian markets in general.

Well, I think so. The car guys are under tremendous pressure—I think they collectively lost around \$8 billion last year—and so they're in desperate mode. But in the electronics industry, the computer industry, we're quite confident. It's not easy, but if you look at high-tech industry, it's generally doing better than the Fortune 500. We're growing. The profit is not as great, but we're more confident, because we have new technology and we have a lot more strategic strength, in software particularly.

We also have some issues to address. We don't think the Japanese are playing a fair game.

How so?

In three areas. In the electronics industry, the Japanese public sector, the government, just doesn't like to buy foreign computers. In comparison, about 40% of the computers bought by the private sector were made by foreign companies. On the government side, they bought about 6% foreign computers. In the central government, they buy only .4%.

And government says, "Well, we're open to bids." They claim that American computer companies don't have enough patience, and it takes a long time to deal with government there.

Which is true. But on the other hand, there is a lock-in arrangement between the local Japanese computer companies—Hitachi, NEC, etc.—with the local public officials.

The second issue is that the semiconductor market in Japan is very difficult for foreign companies to penetrate. In 1986, foreign companies had only 8% market share there. The reason is not necessarily that foreign semi-

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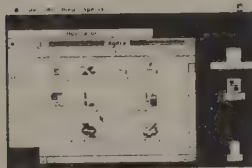
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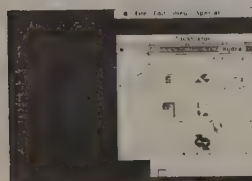
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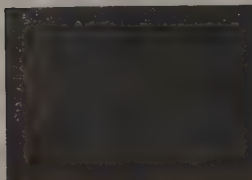


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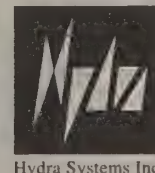
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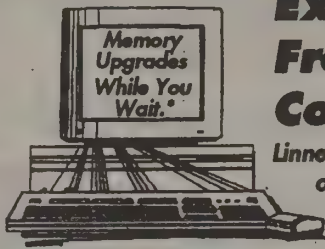
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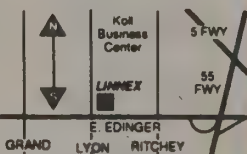
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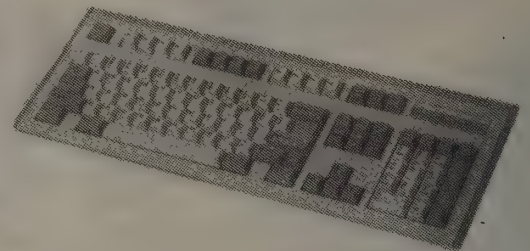


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Silicon Graphics, Sun Microsystems, Applied Materials—their biggest market is Japan, not the US. They're big in Japan for ten years. These companies have a unique technological strength, and the Japanese have to buy from them."

conductors are not good—some are better. But Japanese have the *keiretsu* system, so major computer companies buy from their subsidiaries.

Japanese companies say, "Well, that's true," and so they try to buy more. So last year foreign semiconductors were able to increase market share to 14%—it's stopped there for a while now. So we want to push them to buy more foreign semiconductors.

The third complaint we have concerns procurement of local components and services by Japanese companies in the US. Last year they procured only about 24% local content. In Europe, under local governments' pressure, they've procured about 44% local content.

American companies go to Japan, and we buy a lot of local content. So to be fair, they cannot just come here, set up their company, and buy from their Japanese suppliers from Japan. We want them to create jobs—we don't mind opening up markets to them.

The Japanese are agreeable, and they say they're trying hard. And of course they raise the concerns, particularly in the auto industry—with American cars, the quality is not that great, the driver is on the wrong side, it's too big, it consumes too much gas. Which I think is true. It's factual. But on the computer side, they've got to buy more.

Of course many American companies feel pretty confident. Some of our customers—Silicon Graphics, Sun Microsystems, Applied Materials—the biggest market for them is Japan, not the US. The US is second-largest. They're big in Japan for ten years. They're doing very well.

These companies have a unique technological strength, and the Japanese have to buy from them. When that happens, the Japanese are usually pretty open.

If you've got the right product, they'll buy it?

Right. The problem is if a Japanese company produces a comparable product—sometimes their government works with the private sectors to try to slow down the foreign company, or make it difficult for them to penetrate the market. Not through tariffs these days, but through inspections and all kinds of crazy things.

"Oh, you don't have the right kind of permit. You have to sit on the loading dock for two months."

That's right. And the metric system. "The packaging material is wrong." "The dimensions are off." Very idiotic things. Particularly when the Japanese government decides that this is a target industry, they try to buy time for Japanese companies to grow and catch up. That's a developing country's mentality, but they still have some of that. They're not really that open.

Look how long it took Toys R Us to open a store over there.

Yes, exactly. The bottom line is that you go to Japan and find that prices are very high on many, many things. Even if the tariff is low, the current structure of distribution is very difficult for foreign companies to penetrate. Whatever you want to sell to consumers, they have many layers of markups between the manufacturer and the customer. The dealers have a self-interest to protect the layers.

There are even laws against building big stores.

Yes. And so foreign companies say, "Hey, we don't need this middleman. We want to bypass that." But the law says you cannot do that.

Is Japan typical of Asian markets?

I think so. In terms of free and open markets, I think we're better than the whole world. We still have a lot of items like agricultural products that have some subsidy and some protection—we're not totally innocent either. But generally speaking, in terms of consumer products, in terms of industrial products, the US is the most open and free market in the whole world.

You go to Korea, Taiwan, they still have all kinds of tariff restrictions.

Do you see the solution as coming from the government side or the private sector?

Well, I think it's got to come from both. Certain things the private sector cannot achieve, like import limitation and tariffs, different types of artificial restrictions. Only government can do that for us.

I think the government side is trying hard. We've got to continue to put pressure on foreign governments to open up the markets. However they treat us, if they're not willing to change, we should treat them equally. If they don't want to open their markets, we should

stop certain things and not be open to them. So we have things that sometimes are effective, particularly protection of intellectual property—in software copying, the rest of the world is still doing crazy things. We've got to just ask them and say, "Hey, be fair."

On the private sector side, absolutely we've got to continue to innovate faster and better than foreign companies. Quality has been a weak area in certain sectors of the market, like the auto industry—we just have to catch up.

I think the ultimate judges are the consumers. We let the consumers judge what they want to buy. In the last five years, Apple has sold a lot more Japanese-equivalent desktop computers—the consumer likes that. That's the American strength, and we've got to continue to push that.

Macintoshes do something in the Japanese market that no other system does, essentially.

Right. And that's American ingenuity, American innovation. We have lots of brain power.

So you see most of the barriers as being artificial rather than inherent in the products.

I think so. On this side there's a lot less artificial impediment—for example, cars. We love Japanese cars. We bought 3.6 million Japanese cars last year. Is that good or bad? I think generally that's good, because the consumer enjoys the best price. Of course the auto industry suffers, but the only solution is that they have to wake up and face up to the challenge.

Saturn's doing okay.

Cadillac is doing very well. Ford Taurus is doing well.

Basically I'd say what's happened in the last twenty years—it's not that Americans are that bad, we're okay. The problem is that the rest of the world is catching up really fast. And they work hard. They have lower-cost space. And the Japanese have such a strong dedication on the management side and the workers' side and the government.

I think the quality of work life is not good in Japan, so I think the government is not serving the workers that well in Japan. They've got to do a better job, and I'm sure when that happens, it's going to equalize more. But they still have a certain edge in manufacturing. In the last twenty years, many companies learned from Americans to begin with, and continued to perfect the manufacturing processes. And this country is kind of happy-go-lucky, "we're okay"—we don't improve that fast.

But it's changing. When I travel around the country, everywhere people recognize that the only future we're going to have depends on how quality and productivity are. People acknowledge that we have problems. And we want to do a good job. And I think we will. ■

PREVIEW

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Conference sessions and panel discussions offer a rare opportunity to hear the often-conflicting views of industry leaders on the evolving technology and its probable impact on the way we live and work. A sampling:

Tuesday 6/23, 9 am

Opening Session: Erasing The Boundaries

Richard Green, *CableLabs*

Andrew Grove, *Intel*

Richard McCormick, *US West*

John Sculley, *Apple Computer*

Ron Sommer, *Sony Corporation of America*

Wednesday, 6/24, 2:30 pm

Cable, Cellular, and Satellite: The "Other" Information Networks

Dick Brass, *Oracle*

Terry Hershey, *Time Warner*

Rick Selvage, *SkyPix*

Plus representatives from the cable, telephone, and computer industries

Thursday, 6/25, 9 am

Location-Based Entertainment: Theme Parks and Virtual Environments

Scott Billups, *VizNet Communications*

Brenda Laurel, *Telepresence Research*

Others TBA

Thursday, 6/25, 2:30 pm

Protecting and Valuing Intellectual Property

John Perry Barlow, *Electronic Frontier Foundation*

Sueann Ambron, *Simon & Schuster*

Barbara Zimmerman, *BZ Rights*

David Nimmer, *Irell & Manella*

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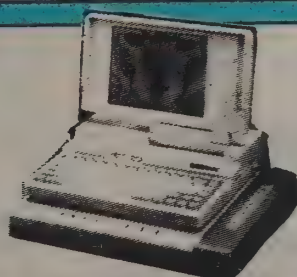
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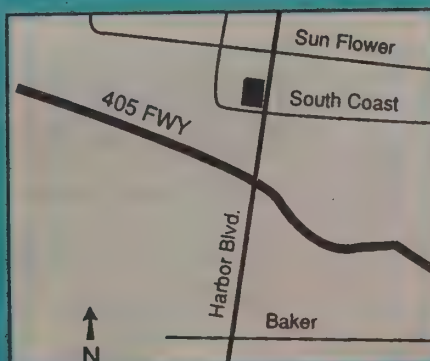


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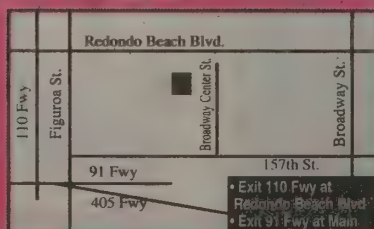
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Autodesk: The Next Generation

Part Two—Challenges For The Future

BY MARY
EISENHART

In last month's cover story, Autodesk founder John Walker discussed the current and future state of the CAD industry in response to the continuing development of powerful hardware and the growing range of potential applications. We continue this month with a discussion of other challenges: keeping your edge, avoiding complacency, and other issues facing a successful software company.

How does a company keep its edge, or its soul, or whatever you want to call it, in the face of overwhelming success?

I haven't solved that problem yet!

I know. That's why I'm asking you, because you're one of the few people I know who seem to think about it at a meaningful level.

Well, no, I think if you look at companies who are successful over a long period of time, you find that there are people there who think about those things. I'm very sure you find it at Microsoft. I'm very sure you find it at IBM.

It's a terribly difficult challenge, because when you build a company, you have to be faced with the reality that as you grow rapidly, at any point in time most of the people you have working for the company are people who arrived after the initial success that created the company.

What is really necessary is to provide the message and the history of the company, so people understand it's not like it was always there. There was a time at which it wasn't there, and there was a time in which it appeared rapidly. That's why I did *The Autodesk File*. It was not really intended to be circulated outside the company—I seem to have that problem a lot. [laughs] It was really just a collection of stuff that people who were interested in where the company came from could use to find out, with the goal of leveraging that experience to people that arrived too late to have lived through it.

The other part, though, is really self-fulfilling, in the sense that if you go on having successes with new products, then you have cadres of people who have seen it happen. And so it is essential that you do what is necessary to make successes of your new products. That's what I'm trying to do right now—guarantee that every product we invest in will turn into a success, if it has the fundamentals to be a success. Again, I'm willing to fail. I'm *not* willing to invest in a product and then never give it a chance—pushing it off the loading dock, as I refer to it. All of the products that we're rolling out this year will be rolled out in a manner distinctly different than the Autodesk tradition, and I believe that more than one of them will be a success.

That changes the mindset of people. You get into this depressed "everything's going to fail" mode. Everything doesn't fail. Companies have lots of successes. But you have to believe in it, and you have to make it happen.

It's not like the product comes out on the end of a conveyor belt and God looks at it and if a lightning bolt comes down you get all this

money. [laughs] You take it off the end of the conveyor belt, you go out in the world, you start jumping up and down and waving it in front of people, and finally convince them that it's worth giving you their money to make you go away. [laughs] And then they take it home, and "Gee, that's really cool!"

But you have to keep pushing. If you look at the companies that advertise and promote most heavily, they're the people that make this [can of Diet Coke]. They're Kellogg's. In the case of Coke Classic, the product has not changed in over a hundred years, and the one time they changed it they regretted it. Kellogg's Corn Flakes—how often do they reengineer that product? Release 3.7? No, no, no, sorry, it's Kellogg's Corn Flakes. And yet they spend billions of dollars promoting those products, because they believe that in the year 2700, if there are still human beings, they will still be eating corn flakes, and they will still be drinking Coke. And they want to own that market, or as large a part as they can.

It's not a self-feeding process. You have to explain the benefits of your product to people. And you have to do it on an ongoing basis as you improve the product.

A lot of it seems to be mutually exclusive loops—you've got the people developing the product, you've got the people marketing the product who are completely clueless about the people who are developing the product, and so it goes all down the line.

I never used to understand, back when I was a big-computers kind of guy, the concept of the salesman who didn't understand the product. The salesman who couldn't demo the product. The programmer who didn't know the names of the competitors of the company, who wasn't familiar with the competitor's product.

To build a company that's a competitor, you have to have everybody be a little microcosm of the company. You've got to have the programmers be intimately aware of what causes the purchaser to choose their product or a competitor's product.

Now that may be marketing, or that may be sales, but if you're a developer and you don't know that, how do you know what to develop? How do you know what your target is, what your priorities are? It's not looking at the competition to be your guide, it's knowing what's in the customer's head. Knowing who the customer is. Knowing how the customer obtains the product.

Similarly, if you're out selling the product, the people you're talking to who are buying the product know about your product, they know about the competitor's product, they know about where the market's going, and if they ask you questions about things like that, and all you know is how to fill out the sales form, how are you going to sell?

So I think that you really need to imbue in the whole organization an in-depth knowledge of what this company does. I think it's got to be across the board. That is part of the reason that Information Letter #14 was so long, and that I wanted so many people to read it. It was because everybody who works here, here in Sausalito and around the

If you don't invest in developing the people you have, in getting the right people, you're going to fail. It's just that simple. This isn't Marin County airhead mush, it's just good business. If your asset is people, and you don't invest in the asset, you're crazy. It's like you're running a railroad and you don't invest in the rails—after a while, the trains start running off. It's just stupid.

world, needs to understand this business we're in, the industry we're in, and what's happening to it over the next ten years.

There weren't any secrets in it. It was really just a view of what the company had to do, that I think you cannot communicate to five people and change the outlook. You have to communicate it to everybody who works in the company, or else you have no chance.

But I certainly learned a lot about publishing. I mean, I sweated blood over this thing [*The Autodesk File*] to get this book put together. Hey, I just leave something on somebody's chair, and before you know it it's all over the world! I guess I'll do that with my next book.

Where does AMIX fit in?

AMIX is, again, I believe, one of these little hard-to-define, hard-to-explain things that, once people experience it, is going to be so obvious that it is going to grow very, very rapidly. I really believe AMIX has as much potential to change the world as anything we've done. And even having watched it be built, heard the rationales, watched it be put together and grow—experiencing it is fundamentally different than what you expected. It's like you can imagine what it's like to be on The WELL, but it's very different to *be* on The WELL.

I've sold stuff on AMIX—actually I have a net profit in my account now—and it's very intriguing to realize, "You know, I do things very differently, even if I'm going to ask two dollars for it, than I do when I'm just posting something to a newsgroup." I put an entirely different amount of work into it, I'm much more concerned about my reputation and the comments that are going to be put on this thing. I make tremendous effort to target the introduction to be both persuasive and fair, so nobody will buy it that isn't going to be satisfied with it.

And similarly, I think, when you're on it as a buyer, you recognize that the sellers are thinking that way. The sellers that do not think that way are going to be selected out very rapidly, because if somebody's asking you for \$15, a book-type price, you're going to read the comments file. You're going to look at the resumes of the people who put those comments there.

Part of it is just fundamental economics. [AMIX creator] Phil Salin was an economist. He understood economics. He understood transaction costs. He understood the way purchase decisions are made. The trend in price in the software business has been down, down, down, down, down. And we have a means that you can sell software for \$2, \$5, \$10, at a lower transaction cost and a lower distribution cost. The rules limit this, but you could sell software for

\$50,000, three copies a year, and have a very low transaction cost and a very low support cost. Companies that sell software for that kind of price tend to have large organizations that could largely be eliminated if they could deliver their updates and support and consulting electronically.

These are all things that AMIX is going to be getting into. We're getting a lot of interest in AMIX purely as a fulfillment mechanism, of being able to sell an update. Your update to Product X, Release 4.0, for \$10.

Are the AMIX guys also Xanadu guys? I always see them in the same place, so I guess I've got that perception.

No. No. They share a parking lot, of course, and they share a lot of the same intellectual groundings and ideology. But there is no connection between the two companies. They are two independent companies in which Autodesk has unrelated investments.

A lot of the connection was that when Phil started to think about AMIX, he saw Xanadu as the ultimate system that would underlie AMIX, the first system that would have the strength to do all the referencing and linking that he would like to do.

In the early days of Autodesk's involvement with Xanadu, he was a very strong force in causing the deal to come through, getting Xanadu organized. He probably spent more time on Xanadu the first year than AMIX. But we concluded that AMIX did not need Xanadu beneath it. An AMIX with Xanadu beneath it will be something very, very different and much better than what we have today, but what we have now could be built as a conventional program, and it needed to be built as soon as possible without waiting for Xanadu in order to succeed.

I take it you think Windows is pretty important.

I think it is of *surpassing* importance.

What is happening is that workstation-class operating systems are becoming available for the masses. Workstation-class operating systems I really define as a system in which graphics, and soon 3-D graphics, are tightly integrated within the system. It has a modern user interface. It has true multitasking, and it networks well.

When that solution becomes available, the software environment is going to change in a very substantial way. You can certainly say, "Well, what about the Macintosh?" Well, before System 7 the Macintosh was not a workstation-class system. Only with System 7, which I guess a lot of people still aren't using, did the Macintosh become a workstation-class platform. And with Windows NT, we will see the PC become a workstation-class platform.

Suddenly all this capability that people have not been able to afford is going to be available. And it is going to change the way everybody builds their applications, buys their applications, and uses their applications.

I don't know for sure, and at some level I don't care, who wins—whether it's Windows NT, or, should Microsoft stumble, an OS/2 32-bit version. Suppose both Microsoft and IBM stumble, and Sun Solaris for the 486 ends up filling that niche. Or all three of them stumble, and OSF/Motif or something like that becomes a standard. Whoever wins, it's going to happen.

It's as inevitable as anything that I've ever seen in this industry. The benefits are simply too huge, and the costs are going to be negative, really, in the sense that when you go into the stores a couple years from now, there isn't going to be much raw DOS software for sale. It's all going to run under the winner of this operating environment battle.

Any software company that doesn't really understand the true significance of this is not positioned to be a survivor across this transition. You have to anticipate both what's going to happen—make some bet on who's going to win, certainly, in terms of where you spend your time—but most of all recognize what the expectation of the user is going to be. Because the user who has a multitasking, multiprocessor, high-resolution system that's networked to lots of other people is going to be using your application in a very different

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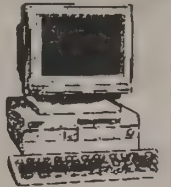
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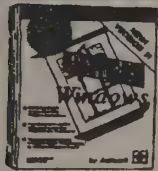
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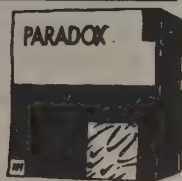
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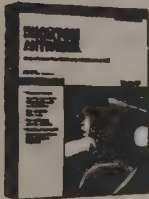
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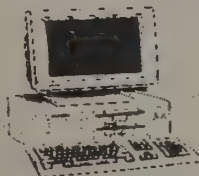
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I never used to understand the concept of the salesman who didn't understand the product. The salesman who couldn't demo the product. The programmer who didn't know the names of the competitors of the company, who wasn't familiar with the competitor's product.

way than the guy that's looking at a black bozo screen one application at a time.

That means that you have to start making fundamental changes—in how you build your product, in what you put in it, in what capability it provides to the user—that are bets on that occurring. Because if you don't start now you're going to be too late.

Now when that standard is created, we're going to have software that can move upward from all the software that's being built for that environment to systems of workstation class and above. NT is going to run on symmetrical multiprocessors. Sun is just getting out a system that runs on symmetrical multiprocessors.

It's not inconceivable to me that in thirty-six months a machine with fewer than four processors is considered as passé as a machine with no more than 640K of memory on it. After all, the chips don't cost very much, and they're plummeting in price. And if you have software that runs six or eight times faster if you put in six or eight processors, you're probably going to put in six or eight processors, if you're interested in going fast.

HyperChem will run eight times faster on an eight-processor machine than it runs on a one-processor machine. The SGI version demonstrates that. We're going to be shipping that one later this year.

Application vendors who wish to play in this environment are going to have to learn to do that. Particularly if, as in the CAD business, you can use any amount of power. We could saturate a machine that was a thousand times faster than anything you can get today, just doing the same kind of stuff we're doing now. So we'd better be able to take advantage of it.

Don't forget the multiprocessor/multitasking aspects of this. I think it's really a very important thing. And all the major players are going to provide it. It's going to be essential.

Everywhere? For what I use my Mac for, I don't see the need for multiprocessing, but will that change?

Well, are you happy with how fast it runs now?

Depends on what I'm doing. For text, who cares? But for PageMaker, I go crazy because it's so slow.

Okay, well, if you go crazy about how slow it is, and the Mac toolbox were running on one 68040 and the application were running on the other, it would immediately run twice as fast, assuming that the breakdown were about half and half.

I just got my 486 this week. I've been using the same 386 20MHz machine for, I guess, four or five years. And for everything I do with the machine except CAD and HyperChem, I was quite happy with how fast it ran. Yeah, it took about seven hours to compile all of AutoCAD, but I only do that every couple of weeks. Besides, it can do that overnight.

But except when I was really beating Excel to death or something like that, or editing a 175-page document, I was fine. But as soon as I start to do CAD—"Oh, this thing is so *achingly slow!*" All the floating

point-intense stuff, huge databases, lots of operations where you're searching through a lot of stuff to try to find things...

I think people are going to be doing things that are fundamentally different as well. But they're not things that you can't think of. It's simply things like photo composition. Photo composition and retouch from your Photo CD. You can use a lot of compute power when you get into the really serious image composition type stuff. Video throws another factor of one thousand at it. When you have a machine that lets you cut and paste moving video, you're going to probably use all the processing you can get, and all the processors you can get, to do that.

The other thing that's happening with these workstation-class environments is that for the first time, applications can live beyond the hardware. I have now had pieces of C code that have run on three different processor architectures from Sun, to which I did nothing other than simply recompile. I started on a Sun 3, 68020. I moved to a Sun 386i, 386 architecture. And now I have a SPARCstation. And I did nothing. I just use the code. I don't even think about it. It's inconceivable to me that as long as there is a Sun, I won't basically be able to take my code and move it along.

Lacking that is something that always seemed to me so foreign about the PC business. Because I grew up as a UNIVAC mainframe programmer. I worked from 1967 through 1978, and actually I did consulting into the '80s, on machines that ran programs that were compiled in 1963. Think about that. Basically children running code that was compiled by their fathers. IBM mainframes have been upward compatible through the years—you have to look at the DOS to OS bump in the '60s as an aberration. Yet here it seems like all your investment is a wasting asset that disappears after twenty-four or thirty-six months.

If you look at the heavy CAD systems, the Cadam, CATIA, ComputerVision, and the rest of the design software that isn't what you'd call CAD—the structural analysis, NASTRAN, Ansys—these are packages that are approaching twenty-five years of age, that have massive investment every year over twenty-five years, of doing more and more and more. Larger models, better user interfaces. When you make a commitment to something like that, that's a long-term commitment. You and the vendor are taking a very profound step.

Because in engineering, we talk about things that span decades. The Boeing 777 is going to be flying in the year 2050. It'll probably fly till 2075 in the secondary and third-tier market. And they're going to be manufacturing replacement parts for it; they're going to be upgrading it; they're going to be stretching it; they're going to be replacing the avionics and all of this stuff, but that's a design that spans a human lifetime from conception to obsolescence. And you don't want to buy into a design system that's going to disappear somewhere during that cycle.

So there is a somewhat different perspective. This is engineering that we do here. Engineering is unlike a lot of other businesses because when you get a wrong answer people get killed. And when you're educated to be an engineer, you take a very different view of quality and accuracy and so forth, that's kind of indoctrinated in one.

If your spreadsheet gets a wrong number, you may be embarrassed. If your word processor crashes, you're going to be furious. But if a CAD system produces the wrong strength number for a load-bearing member in an aircraft wing, airplanes start falling out of the sky. And that's really, really bad.

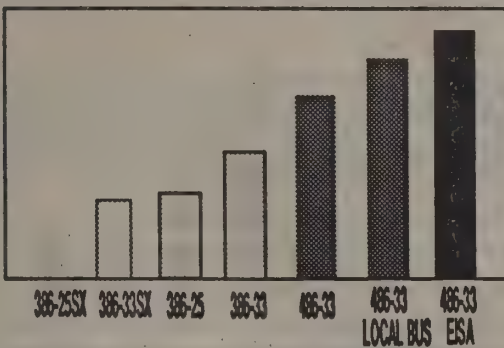
Sometimes we test to death. We're accused of really bashing on the quality of the product. But it can't get wrong answers. It's a fundamental thing. You can't do it in this business.

And so, yeah, we do tend to take a view where you have a long-term relationship with your customer. Your customer is sitting there having, in some cases, many employees spend their whole working day putting stuff into your system and storing stuff in your format, and accruing capital. And as long as there is a CAD market, as long as there's an AutoCAD, it's going to read every AutoCAD drawing back to Day One. However different the environment. However different the user interface.

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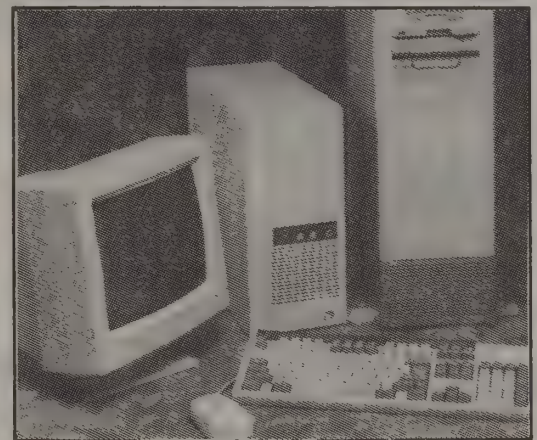
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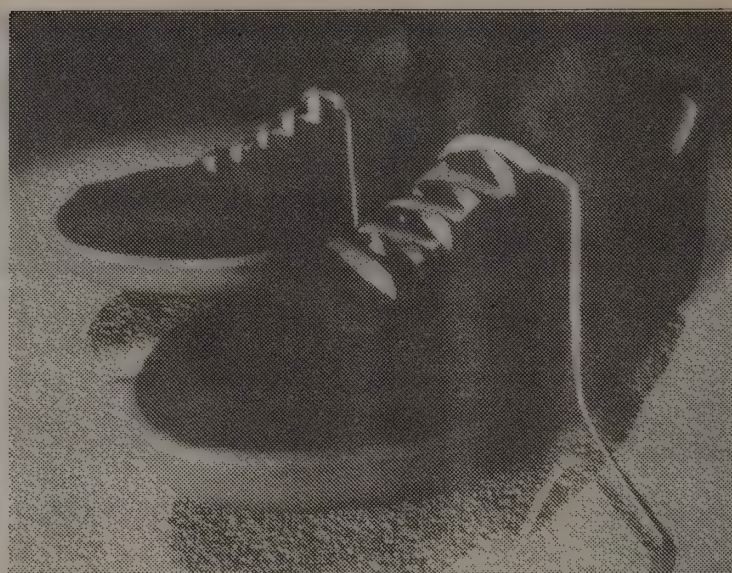
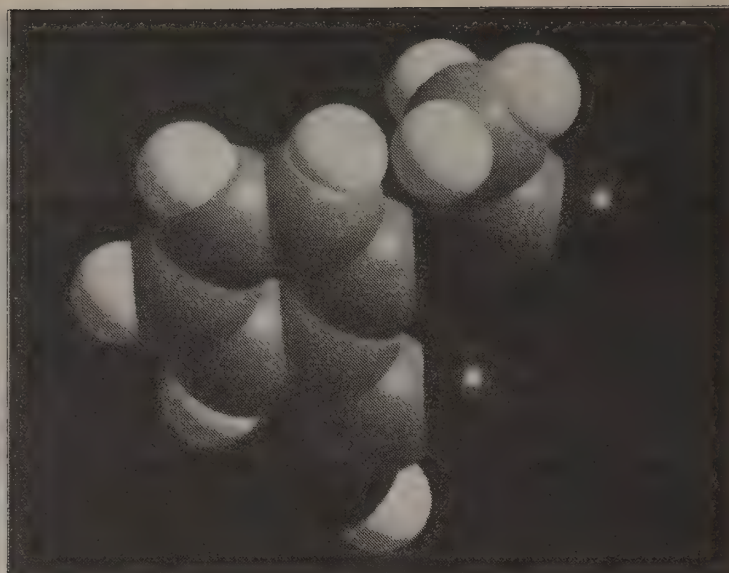


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Windows and these other things give applications that sense of immortality. In the sense that once you buy into it, clearly there's going to be an upgrade path.

I think we need only look at the integration of sound, that you can see both in MIDI Manager on the Apple first and in the Windows Multimedia Extensions. It used to be that if you wanted to do anything with sound, it was all hardware-specific. Anything you did was obsolete in six months because the board that you designed it with wasn't made any more.

Now you write something for MIDI Manager on the Mac, you write something for Windows Multimedia Extensions, and you know it's basically going to work for a very long period of time. Because the drivers have been decoupled from the application.

One of the good things about Autodesk as a company, it's always seemed to me, is that there's always been the perception at key levels that the company's crown jewels weren't some code sitting on somebody's hard disk somewhere, the crown jewels were in the heads of its people.

Mm-hm.

I think, in a software company, you only really have two assets. You have your position in the market and your installed base, and you have what's in the heads of the people who work for and with the company. Because what you're selling today is not going to exist in thirty-six to forty-eight months.

I think everybody in this business totally rebuilds their product, even though it has the same name, over that period of time. You don't start from scratch, you simply replace. If you start replacing 20-30% every release, before long you have a totally new product. And what determines what that product is resides in the heads of the people who are working on those new releases right now.

It is of surpassing importance to make sure that you have the best people you can possibly get.

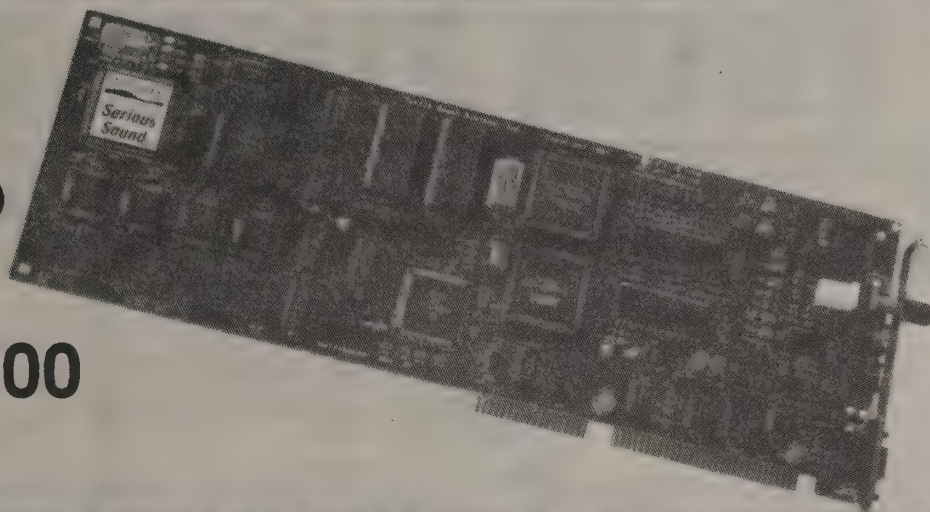
The nature of a business is inextricably related to the constraint upon its growth. In other words, what is the constraint that keeps a company from growing faster, doing more, whatever. That varies from industry to industry. In a capital-intensive industry, it's how much money you have and how much money you can raise. Some businesses are natural-resource-limited—how many trees do you own? How many trees can you cut down a year, if you're a paper company.

The software business is constrained by talent. Human talent. How many talented people can you get to work for your company? How many talented people can

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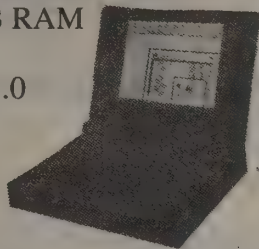
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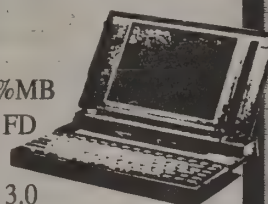
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A Complete Electronic Mail System

The Complete Communicator Gives You A Powerful Voice Mail System As Well As Almost Everything Else You Need To Send And Receive Information From Your PC

BY WOODY LISWOOD

The Complete Communicator does exactly what its name implies. On a single card you get a 2400 baud modem, a 9600 baud fax board, a full- or half-page scanner port, and a complete voice mail system. Yes, a single card, a single memory address, a single interrupt. What more could any computerist ask for?

This new version, v2.62, comes with FAXit for Windows, a fax software package that works with The Complete Communicator background program, and BitCom modem software. Other additions to the fax capabilities include direct scan-and-send support for legal sized documents and high memory support that allows the background program to be loaded into high memory.

VOICE MAIL

The centerpiece of The Complete Communicator is the voice mail system. This system has three types of mailboxes: voice, fax, and modem. You can set any of these types of mailboxes as the default mailbox to which your phone will answer. The fax mailbox comes as the default. This avoids the awkwardness of having everyone call you before sending a fax and having you then switch to the fax mailbox. But you must remember to create a voice message to tell callers that this is both a voice and a fax line and that they should press a key on their touch tone phone to leave a voice message.

To use voice mail, you must first load a background program so that The Complete Communicator can monitor the telephone line and answer the phone. I've tried the background program in low and high memory, as well as under DOS and under Windows, without any problems.

The Complete Communicator comes with a synthesized voice that presents options to the caller. After leaving a message, a caller can be presented with a variety of choices, selected through pressing different keys. These include listening to and/or rerecording a message, continue recording, erasing what was just recorded, or switching to another mailbox to hear or leave other messages.

You can create up to 999 mailboxes, each with its own password. This can make the phone system for your single-person company appear as complicated as your multiemployee competitors. More importantly, you can give each client a separate mailbox and password, allowing you to leave messages specifically for them. This can be especially convenient when you are on the road. The Complete Communicator system lets you listen to the messages left for you, and, if appropriate, leave a response in the appropriate mailbox.

This system also gives you the ability to send voice messages. You can set the time and phone number for sending messages, and request the listener to confirm the reception by pressing the appropriate key. Sending the same message to a group of people is also easy. Record your message, give The Complete Communicator a group phone list, and away it goes. This is the same concept as the broadcast capability that comes with the fax software. Hopefully, the people you wanted are the same people that answered the phone.



If you have a beeper, you can set The Complete Communicator to beep you when you receive a new message. It will call your beeper number, send the numbers for you to call back, and then hang up all by itself. Not bad. You also have the option of having a call transferred, rather than just notifying a beeper.

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WECLY

Creating A Playstation

**BY MIKE
MARKOWITZ**

Any computer vendor can sell you a fully configured workstation, but you have to create your own playstation. "Playstation" is the term I just coined to describe a desktop computer optimized for entertainment.

Computer-based entertainment is one of the noblest applications of technology, but the industry often seems to treat it as a dirty secret. This stems, in part, from the social myth (often mislabeled the Protestant Ethic) that work is good and play is bad.

Early personal computers were often derided as mere toys by mainframe jockeys; so anything associated with entertainment makes some personal computer vendors uneasy.

Why would anyone want to build a playstation when you can get a ready-made game machine for a lot less money?

"Game Machine" describes systems that are microprocessor controlled, but lacking critical attributes of a general-purpose computer (keyboards, disk drives, or serial ports). Some, like the Nintendo or Sega Genesis, are basically peripherals for a television set; others, like the Gameboy or Atari Lynx, are self-contained portables. Game machines incorporate some technology computer users might envy, such as fast 16-bit video, hardware optimized for animation, and low-cost glove-type input devices. But the cartridge-based format limits game machines to a narrow range of mass-market titles—mostly arcade shoot-'em-up action games, with an occasional crossover hit like the strategy puzzle game Tetris.

With a playstation, you have access to much richer entertainment resources. Hundreds of new commercial computer games are published each year. There are no public-domain or shareware Nintendo games, because there is no way a hobbyist could create or distribute such a thing. But you can download literally thousands of public domain or shareware computer games from a good bulletin board, and as programming tools and knowledge become more widely distributed in the culture, the quality of such games is getting better all the time.

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occupants in the
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apartment, or
neighborhood.**

WHY GAMES ARE IMPORTANT

During the '70s and '80s, computer games helped to spark the interest of an entire generation of users. In the previous generation, electronics was something that only interested ham radio nerds and hi-fi audio hobbyists. Programming was something engineers did in FORTRAN, or payroll and inventory geeks did in COBOL.

The desire to make a spaceship swoop across the screen, fire photon torpedoes, and blow up aliens inspired thousands of kids to attempt difficult feats, like learning 6502 assembly language. Game programming is an important seedbed for tomorrow's commercial, scientific, and industrial software talent. That makes it a critical national human resource, since software is one of the few things America produces that the rest of the world still wants to buy, or at least steal.

Game programmers have to wring maximum performance out of existing hardware, and the tricks they discover help to advance technology. Computer game programmers have always pushed the state of the art in graphics, animation, and sound. The creation of simulated opponents for computer strategy games (especially chess) has been an important driving force in the development of artificial intelligence, while interactive text-based adventure games have contributed to the development of computer techniques for parsing and interpreting natural language input.

KINDS OF ENTERTAINMENT

Some users enjoy a wide range of games, some are only interested in a specialized category. Arcade action games (shoot-'em, stab-'em, slug-'em or zap-'em) are perhaps the most popular. Some people play games for the adrenaline rush.

Abstract strategy or puzzle games, on the other hand, can be very relaxing. I've seen people play the solitaire game included in Microsoft Windows for hours, achieving a state of total mindlessness. As one of my teachers used to say, Emptiness is not the worst condition of the mind.

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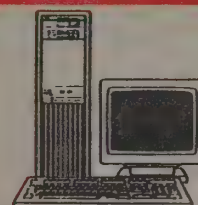
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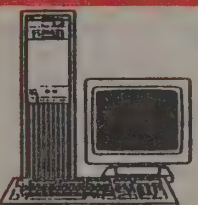
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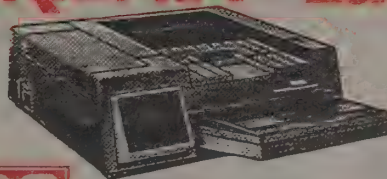
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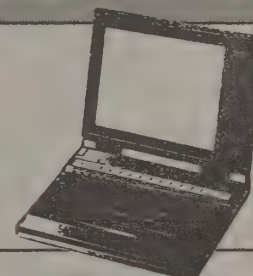
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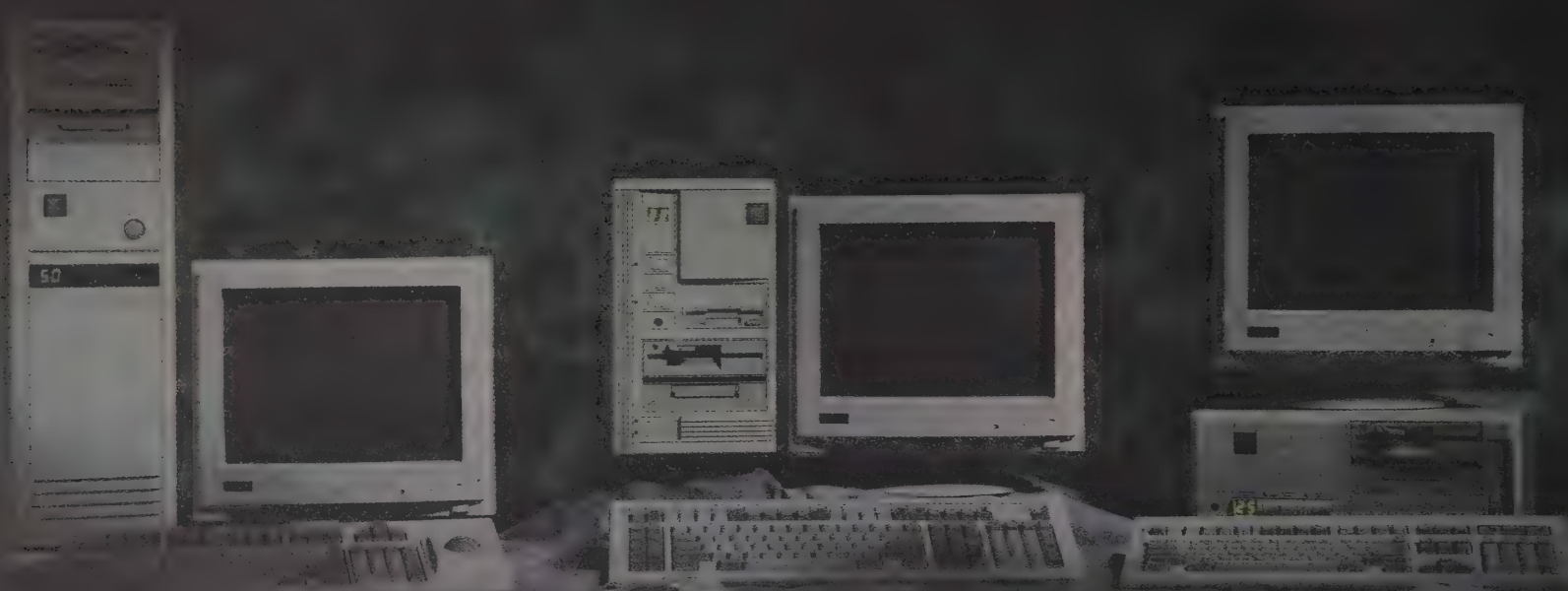
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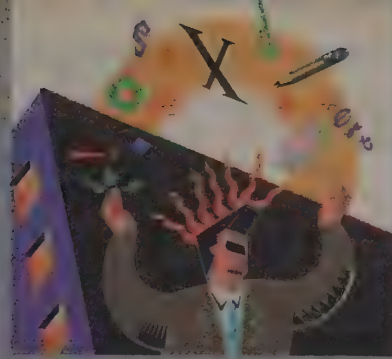
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Interactive adventure games originally developed around the dungeons and dragons/swords and sorcery theme, but can also be found in science fiction, detective, secret agent, and other settings. The common feature is that these games usually involve intricate puzzle solving, and take a long, long time to complete.

Computer implementations of classic board games, card games, and casino gambling have always been popular. Flight simulators are available for every sort of aircraft, although some pilots complain that the lack of rudder pedals, stick "feel," and g-forces makes the "simulation" illusory. Sports simulations are a constant source of new titles—football and baseball being the most popular. Low-energy sports like golf are easier to simulate than high-energy sports like basketball.

"Software toys" are not exactly games, but complex environments you can shape and play around in. SimCity, published by Maxis, created this category, followed by SimEarth and SimAnt.

The quality of a computer game depends on how well the designer and programmers have integrated graphics and animation, sound, and user interface elements into a total experience that is easy for the user to get into, deeply engaging for the imagination, and diverse enough to retain its interest over many playings.

When you are shelling out \$30 to \$60 for the product, you should expect and demand no less.

CHOOSING A PLAYSTATION

Unfortunately, market forces have narrowed the choice of a playstation for users who would like to stay on the leading edge of computer entertainment. You can buy anything you want, as long as it's an MS-DOS system.

According to the Software Publishers Association (SPA) MS-DOS versions represent about 85% of the market for entertainment software. The remaining 15% of the market is divided among Commodore, Apple, and a dwindling number of Atari diehards.

Technically, the Commodore Amiga has many superior features, particularly in the area of graphics and sound. A lot of stuff is built into the Amiga that costs extra (or is just not available) on comparably priced MS-DOS computers. But the size of the Amiga market severely limits the variety of new software titles. Like the Mac, the Amiga is a difficult system for a programmer to master, and many of the games are true labors of love, created by dedicated hobbyists for dedicated hobbyists.

Macintosh might be another option. The Mac IIsi is a good choice, and the IIfx is better, but the great barrier is still cost. The low-cost color Macs (LC or LC II) are not very good game systems unless you buy the rather pricey high-res 13" monitor, and add plenty of extra memory and a big hard drive. Some advantages of the Mac for entertainment include built-in sound output, and (if you have enough video RAM) excellent 256-color graphics. Disadvantages include the lack of a standard joystick port—most Mac joysticks have to share the desktop bus with the keyboard and mouse.

Some game publishers have abandoned the Macintosh, just as they abandoned the Apple II a few years ago. The strongest remaining market for Macintosh entertainment software is probably programs with educational content, since Apple's dominant position in schools had not yet been completely eroded by low-priced MS-DOS systems.

WHAT YOU NEED

A state-of-the-art playstation should be built around an 80386 or 80486 microprocessor running at 20MHz or faster. Since an increasing number of MS-DOS entertainment titles use the Microsoft Windows environment, your playstation should be optimized for Windows—that means a mouse, at least 4MB of RAM (6 or 8 is even better), an 80 or 100MB hard drive, and (very important) a fast 16-bit Super VGA video card with 1MB of video RAM. A color monitor that looks sharp with Windows should look sharp with almost any kind of game.

At present, I haven't seen any MS-DOS games that take up more than 8MB of hard disk space or require more than 2MB of available RAM, but designers and programmers in this competitive market are locked into an inexorable upward spiral, so you have to assume that the hottest new games are going to get bigger and more memory-hungry. Memory and hard disk space are cheap right now, and no user has ever regretted buying too much memory.

The enjoyment of many games is enhanced by a joystick. Some computers have a built-in game port for a joystick; most require an inexpensive card (about \$30 or less) to provide a joystick port. The big CH Flightstick is the best joystick I have used, but smaller models made by Kraft are quite acceptable.

An ideal playstation should have stereo sound output. Audio cards made by Ad Lib and Roland are well supported by current software, but a growing number of PCs have built-in audio, a capability that was

The desire to make a spaceship swoop across the screen, fire photon torpedoes, and blow up aliens inspired thousands of kids to attempt difficult feats, like learning 6502 assembly language. Game programming is an important seedbed for tomorrow's commercial, scientific, and industrial software talent.

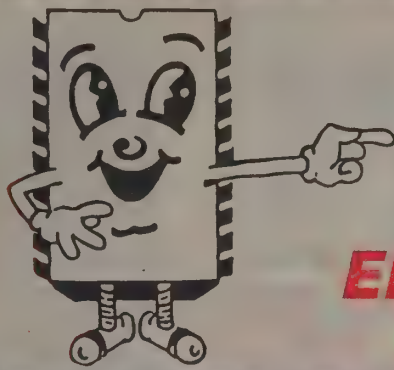
pioneered by Tandy. A good set of earphones is desirable, if high-fidelity digitized explosions or demonic shrieks might disturb occupants in the adjacent room, apartment, or neighborhood.

Something you probably don't need yet is a CD-ROM drive (about \$500). This technology promised almost unlimited storage of high-quality sound and graphics on inexpensive compact disks. There have been a few entertainment-oriented titles, but so far, CD-ROM has failed to catch on as a distribution medium, probably for the same reason the video laser disc never realized its potential—because buyers are waiting for erasable, rewritable optical disks.

A final component to consider is a modem. If you have gaming friends with similar interests, there are many titles that support remote two-player competition over a telephone link-up. Spectrum Holobyte has implemented this feature particularly well in their recent games. Many local bulletin boards provide interactive multiplayer games, and even the most solitary gamer can use a modem to download public domain and shareware or demo versions of commercial games from a BBS or online service.

At current retail prices, it should be easy to put together a playstation for under \$2500. Hey—if you add a printer and some software it even converts into a workstation. ■

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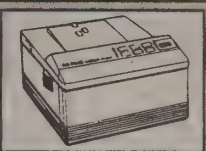


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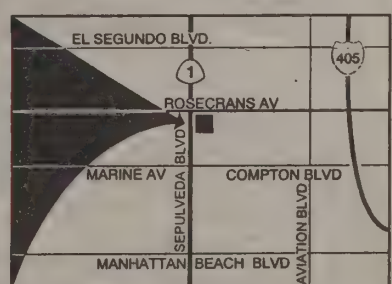
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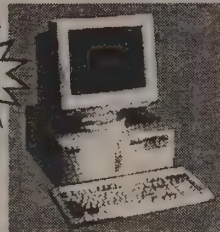


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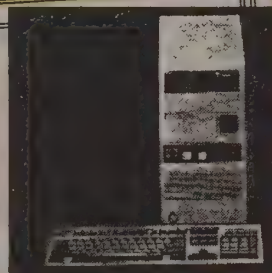
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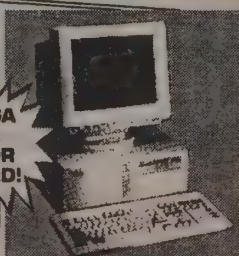


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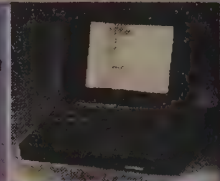


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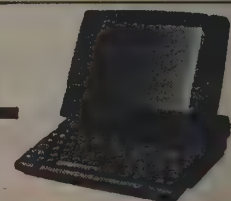
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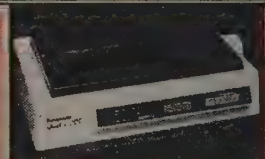
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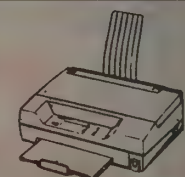


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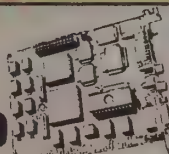
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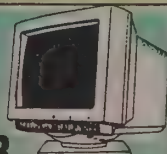
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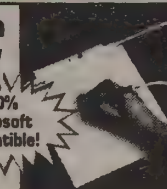


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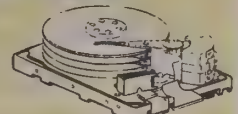
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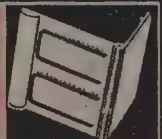
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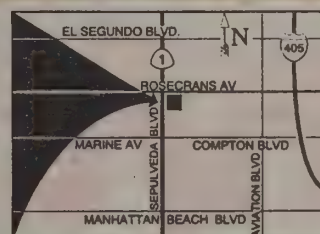
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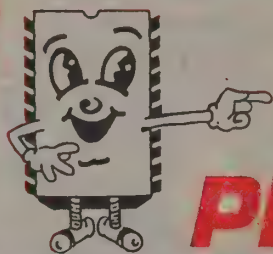
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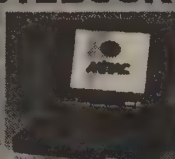


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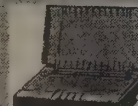
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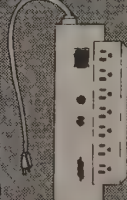
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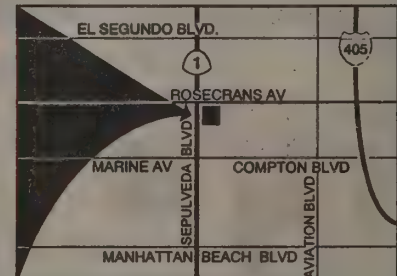
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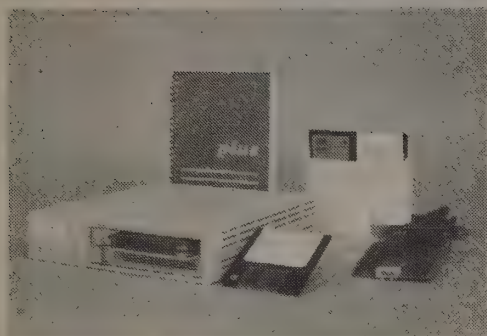
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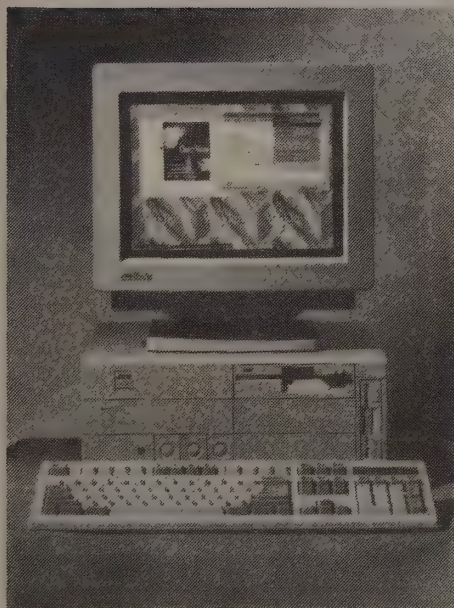
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The SpecPak CT5250 is a complete .25" tape backup subsystem that backs up 250MB of data on a single cartridge utilizing a parallel port of a PCAT, laptop, or notebook computer. Fully compatible with MS-DOS 5.0, it also runs under Novell NetWare 286 and 386. SpecPak eliminates the need for a controller card and expansion slot in your PC and still permits the I/O connection to a printer. This is achieved either by an external Y connector to the parallel port or connected through a SCSI port. The system is integrated with DosArch plus menu-driven software that makes installation and use easy. (\$995) Systems Enhancements, Inc., 780 Montague Expwy., Suite 208, San Jose, CA 95131-1316. (408)944-9670.



JDR MICRODEVICES COMPLETE COMPUTER SYSTEMS

By selecting components for performance, reliability, and specifications, rather than name, JDR Microdevices produces top-quality products at great savings to the customer. Based on 486, 386, and 386SX microprocessors, these new systems provide everything necessary, including MS-DOS and Windows, which come installed and preconfigured. Each system features a non-interlaced, flicker free, 1024 x 768 monitor, 4MB of RAM (expandable to 32MB), 120MB internal hard

drive, 5.25" 1.2MB and 3.5" 1.44MB floppy drive, 101-key keyboard, and serial mouse. (Standard 386DX system is priced at \$1799) JDR Microdevices, Inc., 2233 Branham Lane, San Jose, CA 95124. (408)559-1200.

SOFT-HARD POWER BOX

The new AMI-based Power Box Series I system includes clock doubling, which allows the user to add an Intel

Continued

PRODUCT UPDATES

- **Autodesk Multimedia Division** announced **Autodesk 3D Studio Release 2**, a major upgrade providing new visualization tools and productivity enhancements for graphics professionals using 386/486-based PCs. Autodesk, Inc., 2320 Marinship Way, Sausalito, CA 94965. (415)332-2344.
- **D-Link** introduced **LANsmart v3.2**, which provides a full peer-to-peer resource-sharing solution for both DOS and Novell NetWare. D-Link Systems, Inc., 5 Musick, Irvine, CA 92718. (714)455-1688.
- **Fifth Generation** announced **SuperLaserSpool 3.0**. Upgrades are available to registered users for \$30. Fifth Generation Systems, Inc., 10049 N. Reiger Rd., Baton Rouge, LA 70809. (504)297-7221.
- **Gizmo Technologies** announced **ShadowWriter 2.0**, a major upgrade to its software that allows standalone personal printers to be shared by all the Macintosh computers on a network. Current users can upgrade for \$20. Gizmo Technologies, Inc., PO Box 14177, Fremont, CA 94539. (510)623-7899.
- **M-USA** announced **Pacioli 2000 v2.0**. For a limited time owners of competing accounting, spreadsheet, tax preparation, checkwriter, or personal finance programs can purchase Pacioli 2000 v2.0 for \$29.92. M-USA Business Systems, Inc., 15806 Midway Rd., Dallas, TX 75244. 1-800-933-6872.
- **NewGen Systems** announced the availability of **Windows 3.1 drivers** for its entire line of high-performance laser printers. NewGen Systems, Inc., 17580 Newhope St., Fountain Valley, CA 92708. (714)641-8600.
- **Polaris Software** announced the **Act-to-PackRat conversion utility** and a \$145 competitive upgrade price. The utility translates a file from Contact Software's Act contact management program into a file for Polaris PackRat. The competitive upgrade price is available to users of other PIMs and contact managers such as Act. Polaris Software, Inc., 17150 Via Del Campo, Suite 307, San Diego, CA 92127. (619)674-6500.
- **Revelar Software** released **ConstructionMac 1.2**, a standalone application for estimating residential remodeling and construction. Revelar Software, Inc., 772 E. 3300 S., Suite 210, Salt Lake City, UT 84106. (801)485-3291.
- Users of **T/Maker's WriteNow** can upgrade to **v3.0** for only \$49.95 through June 30, 1992. After that date the upgrade will increase to \$69.95. In addition, when you upgrade, you can purchase an additional copy of WriteNow for your personal use at home or work for only \$69.95. T/Maker Co., 1390 Villa St., Mountain View, CA 94041. 1-800-688-2850.
- **Z-Nix** and **Novell** are bundling **DR DOS 6.0** with the **Z-Nix Cordless Super Mouse** and **Super Mouse II products**. Z-Nix will also package and sell the DR DOS 6.0/ Super Mouse II bundle with **Windows 3.1** as a **Valu Pac**. Z-Nix Company, Inc., 211 Erie St., Pomona, CA 91768. (714)629-8050

J A Dynamo Under Your Arm

ust because you're on the road doesn't mean you have to surrender the dynamic computing power you need. You can carry amazing capacity in your briefcase!

Sager offers several portable 33MHz 386DX and 486DX power stations in notebook sized configurations. Shown here are the NP-205 (a 386DX/33) and the NP-206 (a 486DX/33).

These potent processing stations easily manipulate large database programs. They deftly transmit complex networking communications. Likewise, they breeze through demanding Windows applications as well as any stationary desktop system.

The Sager NP205 and NP206 are equally at home in the office or on the road. When you're in a vehicle, run the optional car adapter/charger. When you're in an office, use the included AC adapter/charger with our optional docking station for full desktop functionality.

Our NP200 series uses a standard 3.5" hard drive format. It's easy to upgrade your system with all the capacity you need, up to 200MB!

Use Sager's optional stand-alone battery charger to charge one set of batteries while you're using the other set. You'll never have to wait for a recharge again!

Your NP200 will include robust, adaptable power management software, enabling you to extend your work-time even further. You will program the sleep mode for the hard disk, the auto screen power-off. You might even adjust your CPU speed. Alternatively, you can simply accept our built-in default values and get directly to work!

There's true number-crunching brawn available exactly when and where you need it. The NP200's provide pure computing muscle - from Sager, the power portable people!

World-Class Portables



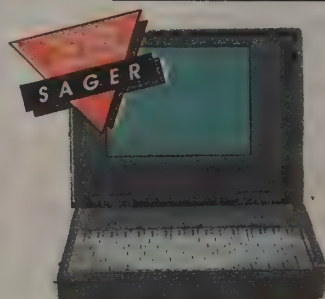
NP-206 486DX-33 \$2495

NP-205 386DX-33 \$2095

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- External Ports for VGA Monitor, 101 Keyboard, Numeric Keypad, AT Bus for Docking Station
- MS Windows 3.1 & MS-DOS 5.0
- 11"W x 8.6"D x 2"H
- Carrying Bag & A/C Adapter

NP-304 386SX-20 \$1495

LCD-386SX-20 \$1375



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- 80-Key Keyboard
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- Carrying Bag & A/C Adapter
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- LCD CCFT 640x480 VGA, 16 grays
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- 40MB IDE Hard Disk Drive
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- Detachable 86-Key Keyboard
- 3 Standard Expansion Slots
- Carrying Bag
- Three Drive Bays
- Weight: 21 lbs
- Size: 15.5" x 9.25" x 7.5"

OPTIONS

- ▲ Additional Battery pack
- ▲ Additional Battery Charger
- ▲ Docking Station
- ▲ Car Adapter/charger

le Power from Sager !!



NP-925 386SXL-25 \$1775

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- 80MB HD (40/60/120MB optional)
- 3.5" 1.44MB Floppy Drive
- 640 x 480 LCD VGA Display
- 9.5" Screen, 25% more viewing area
- 1 Serial and 1 Parallel Port
- Ports for VGA mon., keybd & 5.25" drive
- 83-Key Keyboard
- MS Windows 3.1 & MS-DOS 5.0
- Carrying Bag & A/C Adapter
- Weight 7.7 lbs with Battery
- 12.2"W x 9.5"D x 1.7-2.1"H

OPTIONS :

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- ▲ Car adapter
- ▲ Fax/scanner
- ▲ Ext FDD/RS-232
- ▲ Ethernet (LAN)
- ▲ 2nd Serial port
- ▲ IBM 3270 Emulation
- ▲ Modem
- ▲ SCSI interface
- ▲ Quick charger
- ▲ Others

NP -913 386SX-20

\$1725

NP-902 286-12

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1MB, 20MB without DOS. windows



Expand Your Portable Horizons

Sager's NP900 series portable Comes in your choice of 3 powerful Intel CPU's - the practical 286-12, the proven 386SX-20, and the efficient new 386SXL-25. Each version of the adaptable NP900 is accompanied by an impressive list of user standard features and creative options.

Powerful Standard Features

You'll get 2 large 1400mA battery packs for 4.5 hours of constant operation. An auto-switching AC adapter/battery charger lets you work and charge at the same time.

The large, paper-white LCD screen is 9.5" wide and boasts 64 levels of gray scale. You'll get razor-sharp, lifelike graphic details, even while displaying color images!

Its unique, ergonomic keyboard is wedge-shaped to make typing easier. Thousands of users report it is so easy to use that they never use the external keyboard port. Other ports include a serial and a parallel port, as well as connections for an external VGA and floppy drive.

Choices for creative connectivity

Communicate with a plug-in modem, fax or combination fax/modem module. Scan any document and fax it instantly with the fax/scanner module. Hook into optional CD storage with the SCSI interface. Link up to MPC with the voice mail pack. Add a second serial port to drive another printer or other serial peripheral. Pop in a car adapter. Link-up to Big Blue with an IBM 3270 emulation module, an ArcNet interface, or the optional ethernet (LAN) module. Attach a 2nd floppy disk drive with the FDD/RS-232 module. They all slide into your NP900 as easily as a cassette tape!

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(all boards include CPU, BIOS & manuals)

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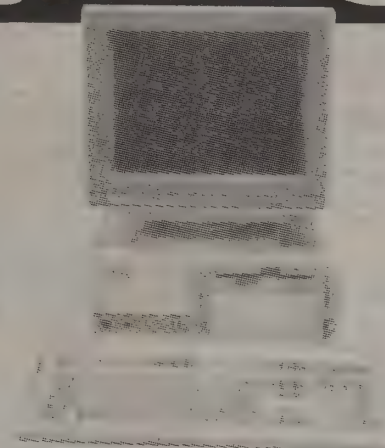
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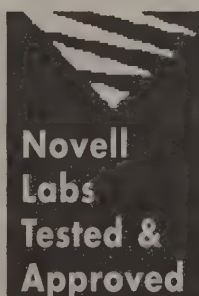
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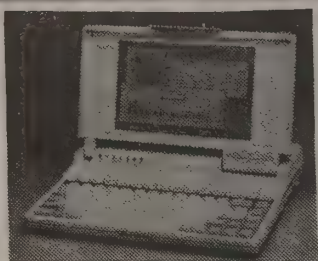
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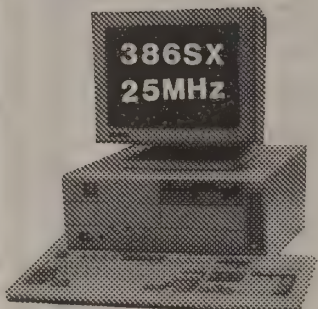
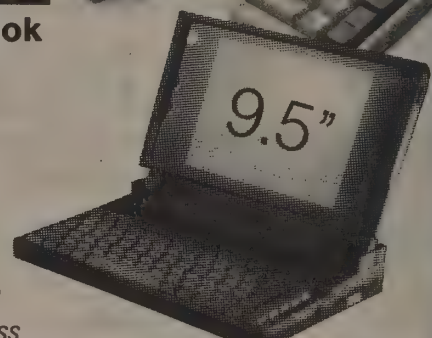
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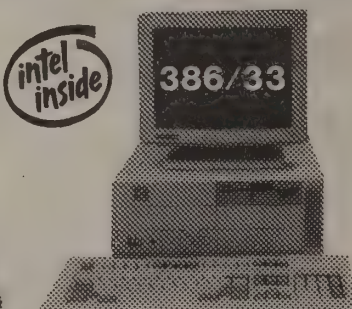
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386-25MHz SYSTEM w/120MB

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- 120MB 19ms IDE hard disk
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- 16-bit VGA card w/1MB RAM
- 1:1 hard/floppy controller
- I/O: 2 serial/1parallel/1 game
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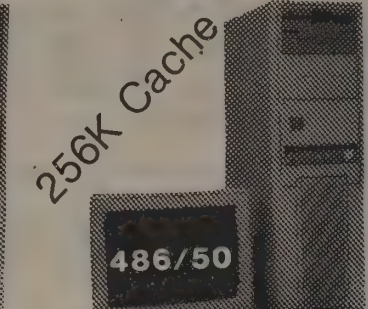
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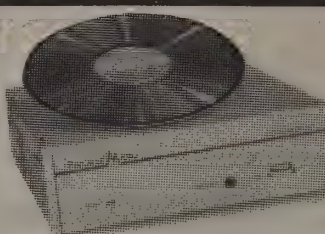
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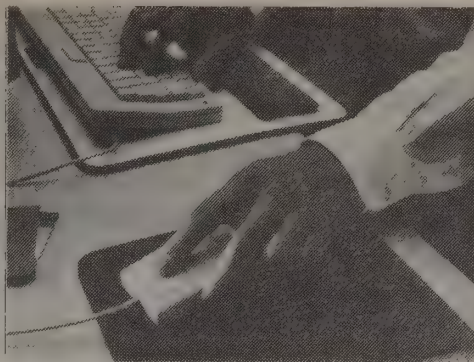
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neoprene foam rubber that will not scratch the work surface. The fabric can be cleaned with warm water and mild soap. (\$18.95, Wristsave Mousepad also available for \$18.95) GBM Design, Inc., 3732 W. Century, Suite 2, Inglewood, CA 90303-1100. (213)677-8801.

sound boards supported), Amiga version also available

List price: \$49.95

The odds are stacked against any computer game that is tied in to a movie. Typically the developer has to pay so much for the rights to use the title and box-cover artwork that little budget is left over for programming. Hollywood studio execs and lawyers, with no understanding of game design, sometimes wind up with creative control over what finally reaches the small screen.

The Godfather is a shoot-'em-up arcade game based on Francis Ford Coppola's three epic films, which were based on Mario Puzo's novel of the same name. The game proceeds through a series of levels—1940s New York, 1950s Las Vegas, 1960s Havana, and 1970s Miami. You shoot the bad guys and collect objects that help you reach the next level. The graphics are stylish and evoke the different settings and decades very well.

This game uses a code wheel for copy protection. Documentation was a mess—a crude leaflet for the Amiga version with the needed IBM instructions on a hastily printed and confusing errata sheet. The IBM version appears to be a market-driven port of something that worked a lot better on the Amiga, where sprites (animated bit-maps) are directly supported by the video hardware. There is no provision for mouse

Continued

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REVIEWS

GAME REVIEWS

By Mike Markowitz

THE GODFATHER

Designed By: Creative Materials

Published By: US Gold

Distributed By: Accolade

For: MS-DOS (EGA, VGA, AdLib, and Roland

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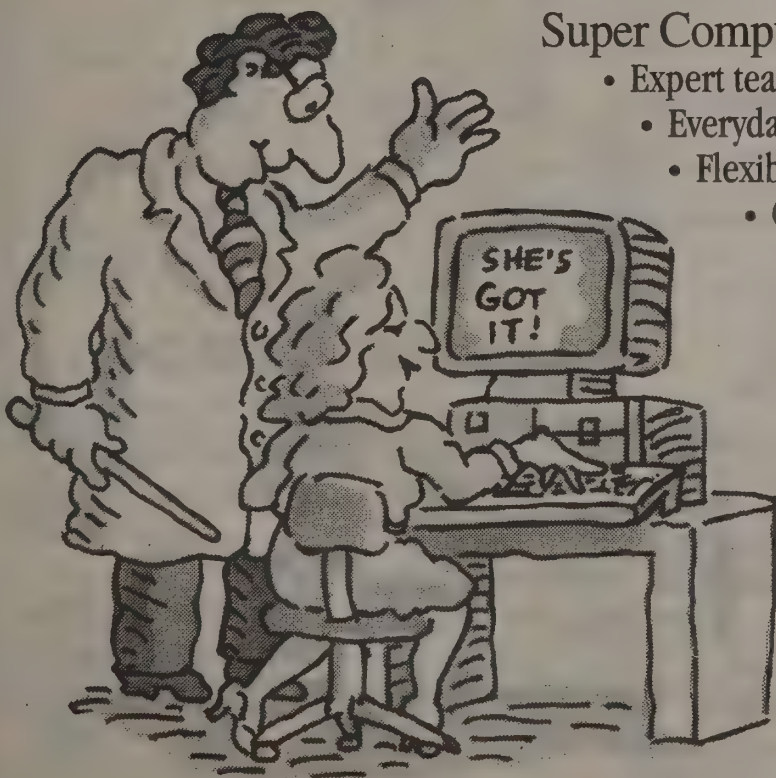
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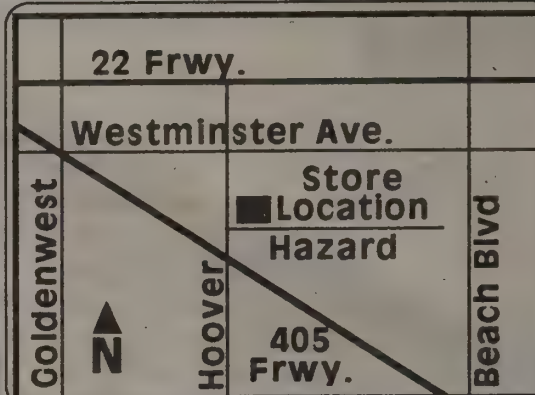
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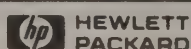
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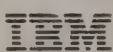
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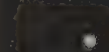
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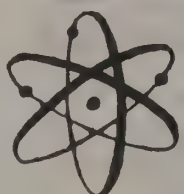
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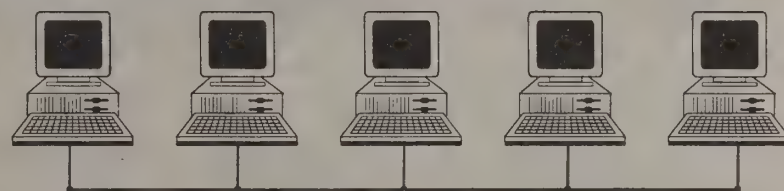
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PRODUCT SPOTLIGHT

control—and the keyboard controls are so awkward that you really need a joystick to play.

Overall, this Godfather makes MS-DOS users an offer they definitely can refuse. Now I can just see the headline, "Game Reviewer's Kneecaps Shot Off By Unknown Gunmen."

Graphics and Animation: 8
Sound: 7
User Interface: 4
Overall Value: 4

WARLORDS

Designed By: Steve Fawcner

Published By: Strategic Studies Group

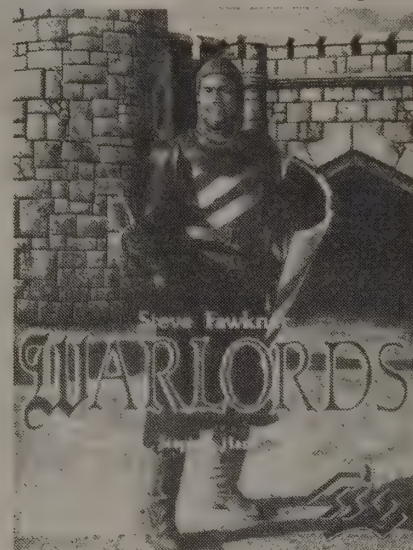
For: Macintosh (Plus to Quadra) requires 1MB for monochrome, 2MB for color; System 7 compatible

List Price: \$59.95

Warlords is a sophisticated strategy game with the flavor of J.R.R. Tolkien's sword-and-sorcery epic *Lord of the Rings*. You command one of eight powers, contending for control of the mythical land of Illuria. There are impassable mountains, mighty rivers, deep forests, and one offshore island. The land is dominated by eighty castles and littered with ruins, temples, and tombs where powerful artifacts may be searched and discovered by your daring

hero. Control of castles gives you income to raise armies, build fleets, and hire the occasional errant hero who may wander into your domain.

The screen is divided into a strategic window that shows you an overview of the entire land, and a tactical window that gives you a detailed view of small areas. Armed units are represented by well-



designed icons and up to to eight can be stacked in a single square. Combat can be initiated during a movement when enemy forces occupy an

adjacent square. The rather complex combat system is fully explained in the manual—it favors quality over quantity. The combat display is neat—the icons of both sides face off and take shots at each other until one side is eliminated.

This bare description does not convey the truly addictive quality of the game. It is difficult to pull yourself away from the computer because you really want to see what the next turn will bring. The look and feel of the graphics are excellent, sound effects are used effectively, and the user interface is smooth and intuitive. The algorithms that drive your computer-controlled opponents make for a real challenge, with variables that allow many levels of difficulty, but it is possible to win a game without devoting months of your life to mastering it. Warlords is a model of how a computer war game should work—I only hope that SSG will apply some of the same ideas to "real" historical games, without the dragons, crypts, and wizards.

The package includes two 800K disks, a 48-page reference manual, and a colorful map. A third disk contains an elaborate HyperCard-based catalog of SSG's games.

The Macintosh version was programmed using MacApp, and the user interface is pure enough to please the most fanatical Mac cultist. The application size is 725K, with color resources adding another 662K and sound 108K. A saved game takes up only 52K. (Strategic Studies Group, 8348 Monticello Ave., Pensacola, FL 32514. 904/494-9373. Fax: 904/494-9374)

User Interface: 9
Graphics and Animation: 8
Sound: 8
Overall Play Value: 8

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Designed By: Ned Martin

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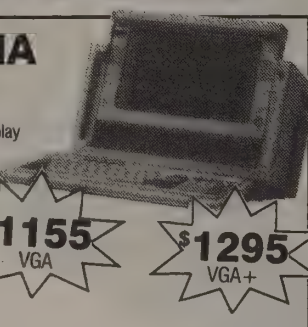


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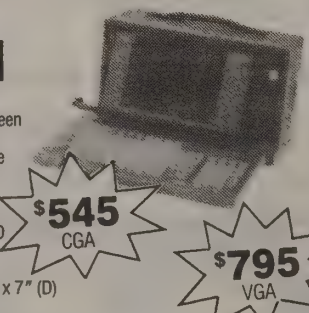
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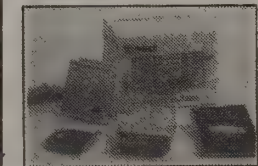
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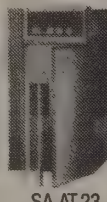
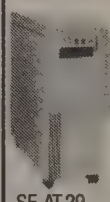


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Golf has always been the favorite sport of the ruling class, it requires the conspicuous consumption of the ultimate resource: open space. A lot of top-quality development work goes into golf simulation for personal computers, since users interested in golf are likely to have upscale demographics and high-performance computer systems. Because golf lacks the visceral appeal of violence, and the kinetic thrill of fast action, a golf simulation needs beautiful landscape graphics and clever animation to engage the user. This new edition of Accolade's very successful Jack Nicklaus series justifies all that money MS-DOS users are spending on fast 386/486 CPUs, SuperVGA cards, and big hard drives.

The power bar that controls your swing has been relocated horizontally, rather than vertically, to allow for

a wider screen view of the fairway. The depth and richness of the simulation have also been enhanced. Fairways and greens have remarkable three-dimensionality. The effect of wind on the trajectory of the ball is modeled realistically. Bounces and rolls are simulated in a way that should satisfy the most demanding golf-loving

physicists and engineers. The digitized sound of the swing even changes according to the club you select! A "tape measure" feature lets you determine the exact distance from the ball to any other object on the overhead view of a hole. Putting is still the most difficult part of the game

The program's twenty-one files occupy 1,689,769 bytes after installation, the executable for the basic game is a lean 86K. You have a choice of two simulated courses, English Turn Golf Club (New Orleans, LA) and Sherwood Country Club (Thousand Oaks, CA). The most impressive feature of the package, however, is the Course Designer, a separate application that allows you to design a single



hole or an entire golf course, following procedures that model the process Jack Nicklaus actually uses to shape a raw plot of land into a championship golf course. A program map, organized like a flow chart, guides you through the steps. You can create landscape objects using a built-in paint program, or import any graphic in .LBM or .PCX format.

The handsome 124-page manual provides detailed instructions on how to design a course. The program uses a code wheel copy protection scheme.

Graphics and Animation: 9
Sound: 8
User Interface: 7
Overall Play Value: 9

UPDATE ON BLADE

Few things are perfect the first time out, and I was pleased to receive a "version 1.1 upgrade" to the game BLADE,

published by Leviathan Corp. and reviewed here last month. BLADE is a visually and sonically stunning arcade-type game for the Macintosh that was, alas, virtually unplayable as it originally shipped.

One of the most serious problems with

the original version was that it used the keyboard to control movement and slashing. On the Standard Apple Keyboard or Keyboard II, this problem was fatal because the hardware cannot "see" more than one keypress at a time (the Apple Extended Keyboard does not suffer from this limitation). The first screen has been made much easier, and there are various bug fixes and animation performance improvements. The upgrade is installed by simply dragging a few files into the program's folder.

One of the fixes in the BLADE v1.1 upgrade is that you can now attack by pressing the mouse button. You can also adjust the speed of the game in a Preferences dialog box, and you can restart at the beginning of the level you were on when you were killed. Best of all, BLADE now supports the Gravis MouseStick, probably the most popular joystick used with Mac games.

The upgrade is available to registered owners of BLADE. (Leviathan Corp., 31201 Chicago Rd. S., Warren, MI 48093-5527. 313/826-3560)



PC SOFTWARE REVIEWS

FAXIT FOR WINDOWS

Published By: SofNet

List Price: \$119.95

Reviewed By: Woody Liswood

FAXit for Windows, like its competition WinFax and WinFax Pro, provides high-quality print to fax service running under Microsoft Windows. It provides the ability to print directly from a Windows application through your fax board. Both FAXit and WinFax Pro work great. The major difference, and the reason for this article, is

Continued



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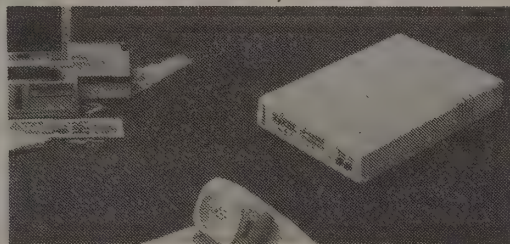
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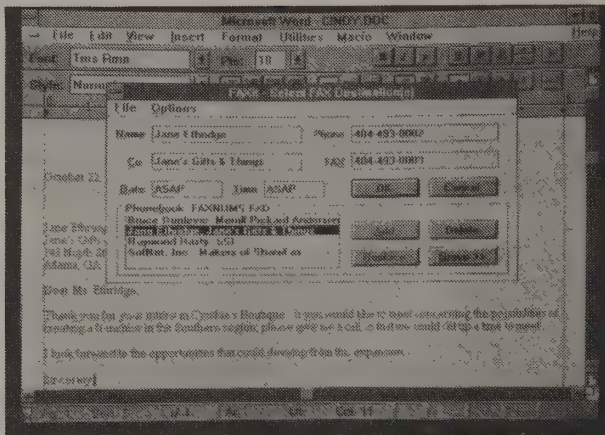
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PRODUCT SPOTLIGHT

that FAXit works with a greater number of fax modems than does WinFax Pro.

FAXit requires a 35K TSR to be loaded before you run Windows. Since I rarely need to receive faxes while doing other work, I would like to have the option to install FAXit as a send only fax with any of the boards. This would preserve more of the low-end memory for use with applications.

During installation you can choose the modem, or modem type, from a variety of fax modems. FAXit also tests the modem connection, briefly, to insure that all is well, but will install even if there is no connection. With the World Port, FAXit told me I had an older version and instructed me to upgrade the ROM. I called the new owners of the World Port modem, US Robotics, and they sent the upgrade right away—at no charge unless I did not return the older EPROM.



The FAXit phone book works well, and unlike Winfax Pro, you can store numbers for a voice phone as well as a fax. And, as you might expect, you can group the entries, letting you broadcast the same fax to multiple locations with only a few mouse clicks.

From within the FAXit log section, you can view faxes which have been sent, resubmit failed faxes, and generally get the information you need about the faxes. After viewing a fax, you can save it in a variety of formats—TIFF, .PCX, .CAS—and print it as well.

Overall, FAXit is a competent program that supports a wide variety of fax boards—all of this is done in an easy to install, easy to use, and understandable manner. (SofNet, Inc., 380 Interstate N. Pkwy., Suite 150, Atlanta, GA 30339. 404/984-8088.)

Continued

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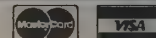
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SLT/286	1MB BD 129.00
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& 20, 25, 33	8MB Kit 409.00
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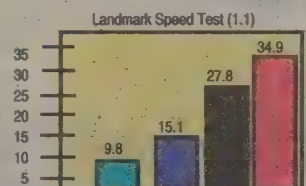
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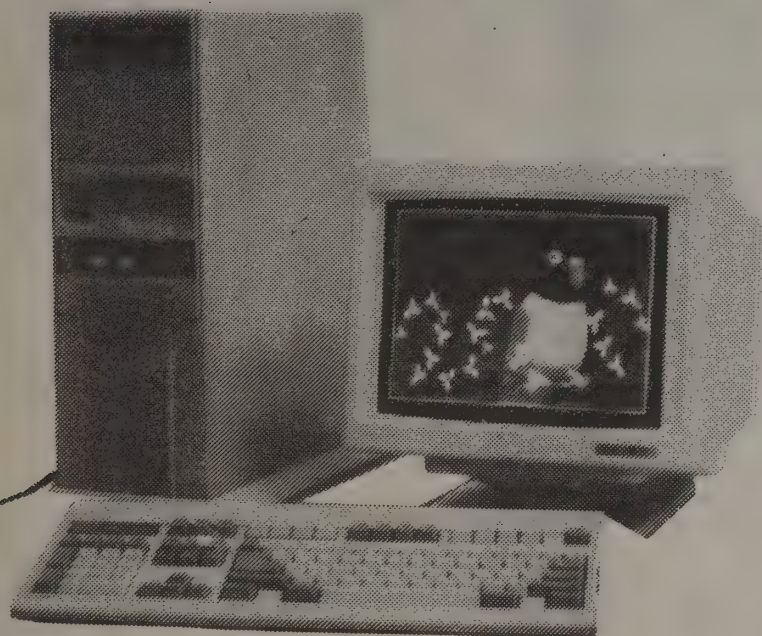
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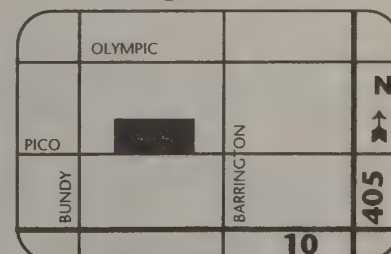
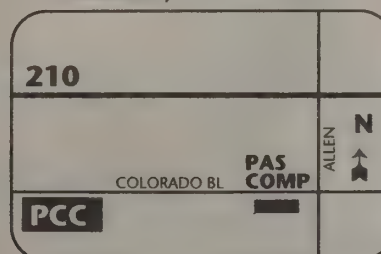
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PRODUCT SPOTLIGHT

WINSPEED

Published By: Panacea

List Price: \$79

Reviewed By: Woody Liswood

Are you running Windows and concerned that it just does not have the speed and snap that you want? Other than upgrading to a 50MHz 486, WinSpeed may do the trick for you.

Panacea calls this a software-only display accelerator, I prefer to look at WinSpeed as a replacement display driver for your SuperVGA card. Whatever it is, it adds speed to your Windows display viewing.

You do, however, have to have the right equipment before you go out and get WinSpeed. You must have a SuperVGA display board that uses the ATI, Paradise, Trident, Tseng, V7, or Zymos chip set, you must have enough memory to display 256 colors, and you must be running Windows 3.0 or 3.1 (I don't think anybody uses Windows 2.0 anymore, do they?).

If you meet these requirements, Panacea says that you can get up to five times more display speed. I do not know about the five times, but I can tell you that you can physically feel and see the difference in how fast the display reacts.

Installation of WinSpeed changes your SYSTEM.INI and SETUP.INF files. But WinSpeed does save your old files so you can easily go back to your original setup.

If you really want to see Windows fly, and already have the necessary equipment, get WinSpeed, it works. (Panacea, Inc., Post Office Sq., Suite 4, 24 Orchard View Dr., Londonderry, NH 03053-3376. 1-800-729-7420)

WP2DOS PLUS

Published By: Club 100

List Price: \$79.95

Reviewed By: Peter John Harrison

If you need a laptop for basic word processing or note taking, but you're on a budget, Tandy's WP-2 portable word processor is worth considering. Costing around \$300 at Radio Shack, it's smaller, weighs less, and has a substantially longer battery life than any DOS notebook or laptop, though it sacrifices the disk drive and the display is only eight lines long. I use mine for all kinds of

writing tasks, then upload my document files to a PC for final editing and printing.

To transfer my WP-2 files back and forth, I use a program called WP2DOS Plus, from Club 100. I could transfer files to my PC using the directions in the WP-2 manual, but the Tandy way is cumbersome, hard to follow, and doesn't preserve my document formatting.

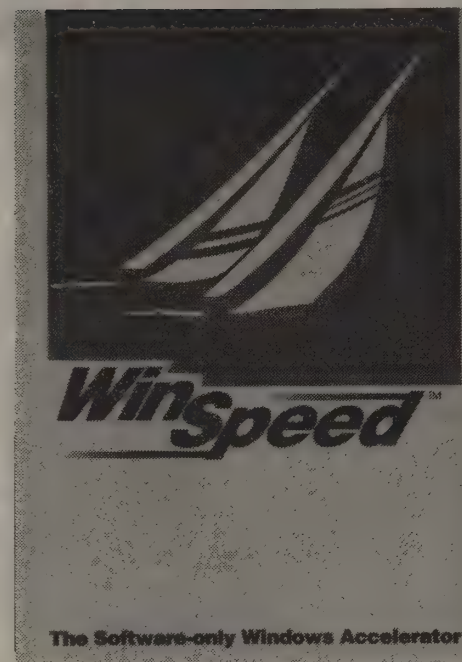
WP2DOS Plus does a much better job. By emulating the optional WP-2 floppy disk drive through my PC's serial port, WP2DOS Plus makes moving files between my PC and WP-2 as easy as entering WP-2 copy commands.

WP-2 files transferred to the PC are stored in the WP-2's native .DO format. WP2DOS Plus then provides file translation options for most major word processing packages, so WP-2 documents can be moved back and forth between WP-2 and desktop without sacrificing document format.

WP2DOS Plus's documentation is brief and reasonably complete, and the

package includes the computer cable you need to connect your PC and WP-2. As for the software itself, it doesn't have pull-down menus or support a mouse for point-and-shoot file selection, but it's straightforward and easy to use.

If moving files between my WP-2 and PC was a hassle, I wouldn't use my WP-2. With WP2DOS Plus, my WP-2 becomes an important part of my writer's tool kit. For people like me, who have both a PC and a WP-2, WP2DOS Plus is an absolute necessity. (Club 100, Inc., PO Box 23438, Pleasant Hill, CA 94523-0438. 510/932-8856. Fax: 510/937-5039)



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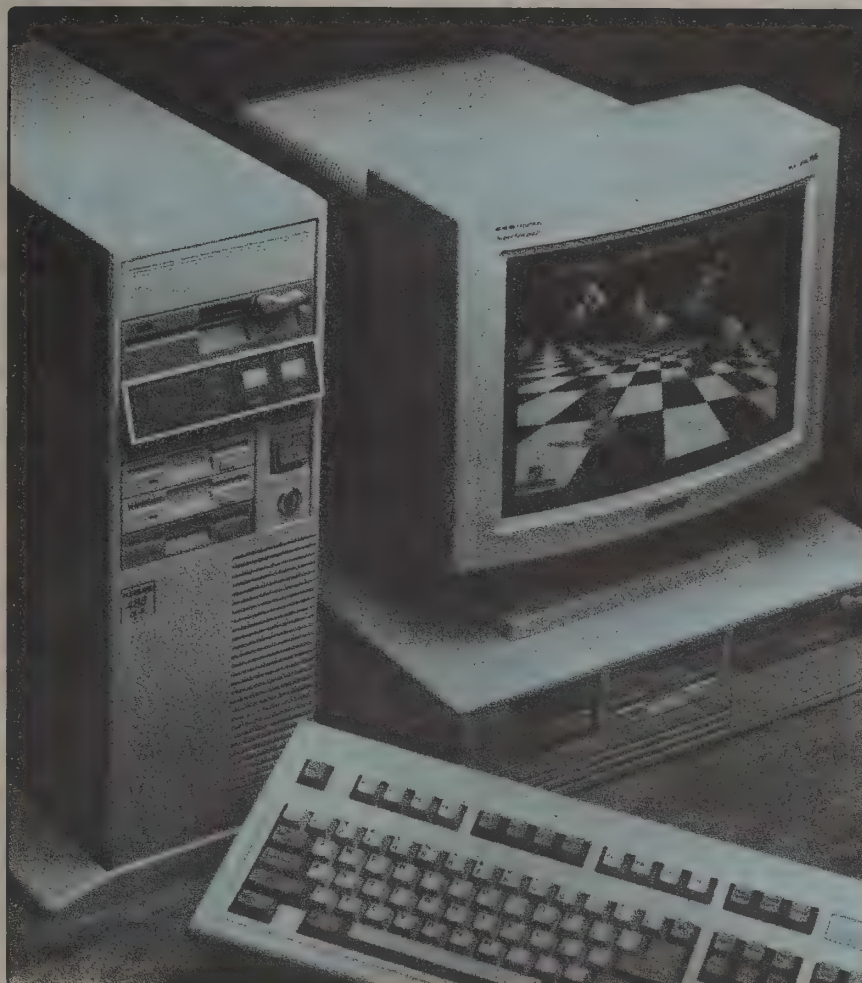
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PRODUCT SPOTLIGHT

Published By: M&T Publishing
List Price: \$32.95 (with disk set)
Reviewed By: Woody Liswood

If you are one of those people who needs to take the cover off a computer, *Troubleshooting Your PC* is the book for you. In close to five hundred pages, this guide touches upon almost anything you can think about in relationship to your computer. For instance, there were great discussions about

memory conflicts which could help you if your SCSI port wants to share a DMA channel or memory address with any of the other boards in your system. About the only thing I did not find was a section on CD-ROM drives and how to install them using a SCSI port.

There is one anomaly, though. On page 444, you are told that there is a companion disk for the book on a diskette inside the back cover. The last page of the book, however, is an order form to send away for the optional utilities disk for \$15. Some copyediting needed here!

The book has an easy-to-read style with easy-to-find icons to identify different sections. You can quickly find any symptom simply by looking for its associated icon. If the symptom matches your

problem, an "eye" icon identifies suspects, and a "light bulb" icon identifies possible solutions.

The excellent reference section by itself makes this book worth the cover price. This is another book which has a permanent spot in my library. (M&T Publishing, Inc., 411 Borel Ave., San Mateo, CA 94402-3522. 415/358-9500)

TELECOMMUNICATIONS HARDWARE

THE COMPLETE FAX/PORTABLE PLUS

Manufactured by: The Complete PC

List Price: \$499

Reviewed By: Anna Couey

The Complete Fax/Portable Plus is a menu-driven, easy to use (if you remember to read the instructions) 2400 baud send/receive fax modem for PCs and compatibles. The portable CFax unit has two phone jacks, so you can attach it to an existing voice phone line and automatically receive whatever transmission comes your way. Its dimensions are a compact 6" x 3" x 1" and it weighs 6oz.

As a modem, I found CFax to be completely reliable (though I prefer Procomm to the BitCom package that came with the unit). It is configured to adjust to the protocol mode of the system you are connecting to—whether asynchronous, V.42, or MNP.

CFax includes quite a few nice fax features. You can broadcast faxes, as well as schedule your faxes to be sent at a particular time. You can convert a number of graphic file formats, including TIFF, from and to fax format; ASCII files can be converted to fax only. CFax also reads scanned documents, if you have a scanner. The CFax software gives you the option of customizing a fax coversheet, complete with logo, to accompany your faxes. CFax also lets you maintain a fax directory. The unit can send and receive faxes in either standard resolution (204 x 98) or fine resolution (204 x 196). And, you can receive faxes while you are using other applications.

The criticisms I have are relatively minor annoyances. One is, if you have a multiple-page fax document, you have to select each page to be transmitted. If you simply select the fax from a list of available faxes to send, only the first page gets transmitted. I sent several fax fragments before I realized what I was doing. Another criticism is that the CFax software doesn't tell you whether your fax has been transmitted successfully, it just sends it and hangs up. Personally, I like confirmation.

The Complete Fax/Portable Plus does everything it claims, and it does it very well. Rarely completely satisfied, I'm waiting for the day when I can easily receive a fax, convert it to ASCII, and send it back out on the nets! (The Complete PC, 1983 Concourse Dr., San Jose, CA 95131-9841. 408/434-0145. Fax: 408/434-1048.) ■

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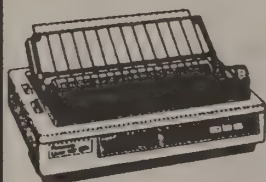
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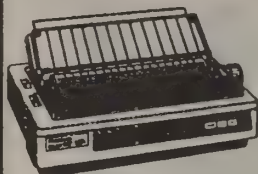
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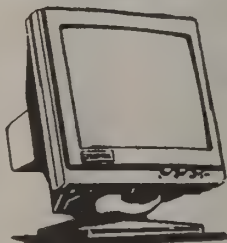


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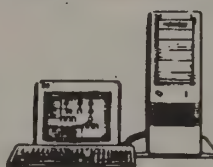


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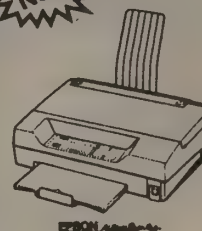
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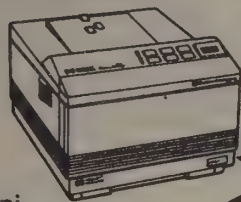
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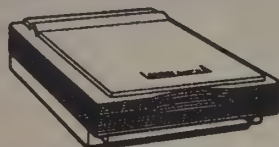
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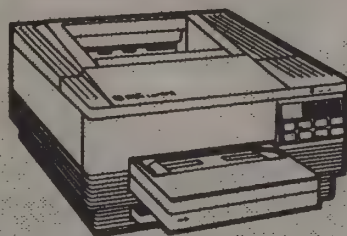
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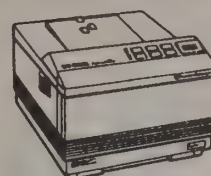


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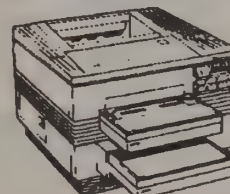
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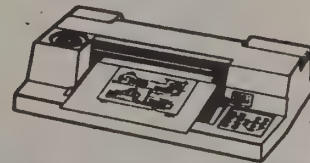
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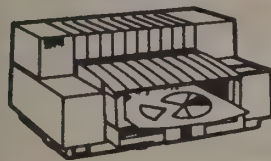
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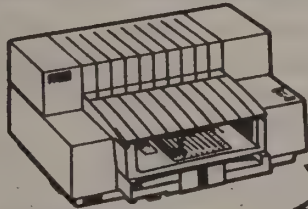
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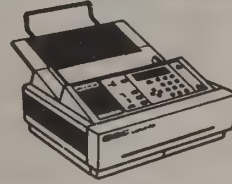


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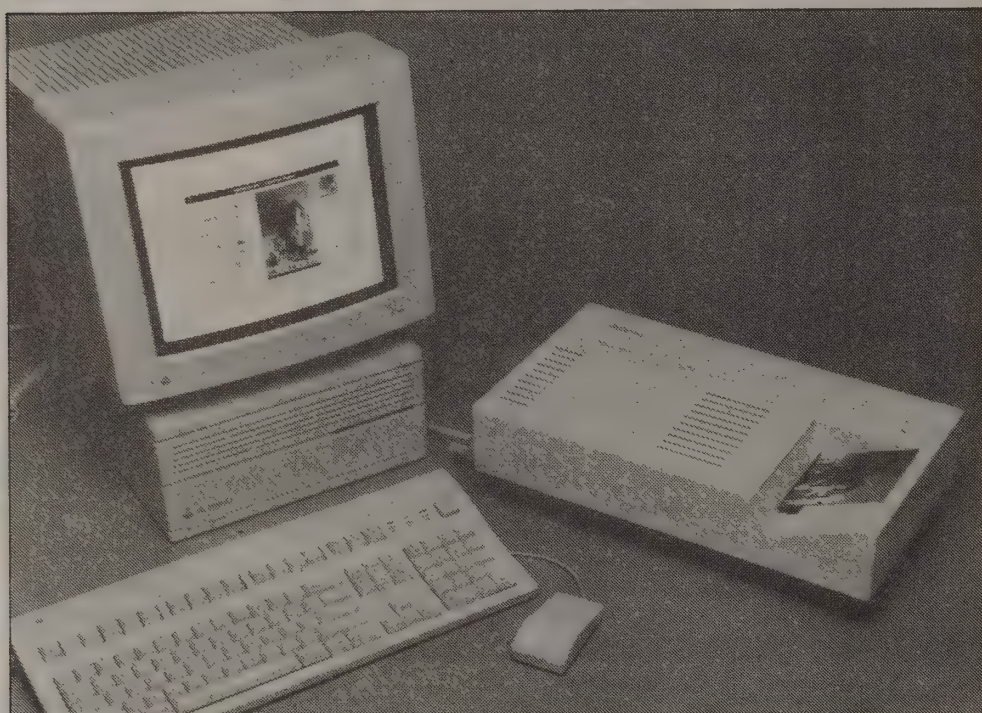
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Virtual reality is beginning to reach the personal computer, one finger at a time, as supporting technologies are evolving to become more efficient and affordable. Those same improvements and enhancements have been raising the level of more realistically "natural" characteristics at the desktop.

Speech is one capability that's long overdue. Natural-sounding synthesized voice is coming closer now with the Sound Bytes Developer's Kit from Emerson & Stern Associates Inc. While it still sounds a bit robotic, it allows Macintosh developers to incorporate more human-sounding speech modes into applications.

In computer graphics, screen images are beginning to look less "electronic" and are displaying more of the range of subtleties served by traditional media. Fractal Design Corporation's Fractal Painter program provides a full palette of realistic textures that show the responsive "feel" of brushed oil, pastel, chalk, crayon, and a variety of papers.

Light Source's Ofoto is able to interpolate scanned images from photographs and deliver black-and-white hardcopy prints that have the credibly smooth tonal ranges that we associate with photographic prints. Ofoto introduces a basic user level that offers point-and-shoot simplicity, eliminating the need of the trial-and-error process of multiple passes.

Now, right on the heels of Kodak's new Photo CD, Polaroid has

introduced its Digital Photo Scanner system. Now we have several high-resolution imaging choices at the desktop that might be called "virtual naturalism."

POLAROID'S DIGITAL PHOTO SCANNER

Long known for "instant" color photos, Polaroid has introduced an equally quick turnaround from paper print to high-resolution digital image on the screen of a Macintosh or PC.

For some time, Polaroid has been introducing a suite of desktop digital imaging peripherals—the Polaroid Digital Palette Film Recorders, the Polaroid Digital PhotoPrinter, the Polaroid Thermal Printer, and now the Polaroid CS-500 Digital Photo Scanner (\$4495 bundled with Adobe Photoshop, \$3995 without). Of these units, the new Scanner is perhaps the most interesting in terms of applications for desktop publishing and multimedia.

The CS-500 is limited in terms of its 4" x 6" maximum document input. Polaroid's market research has determined that that standard color print size is by far the most widely used of the billions of prints produced worldwide every year. Despite this limitation, the CS-500's speed and the quality of its image capture and display set it apart from other products.

The maxim of a captured image being only as good as the original

Copyright © 1992 by Tony Reveaux. All rights reserved. Tony Reveaux, a San Francisco-based consultant, is the editor of Computer Publicity News and a contributing editor for Artweek, and writes the "MediaScan" column in Film/Tape World. He can be reached via Internet (luna@well.sf.ca.us) or MCIMail 290-3008.

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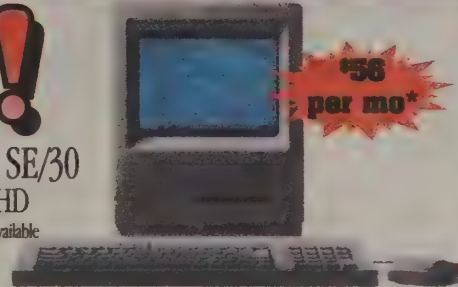
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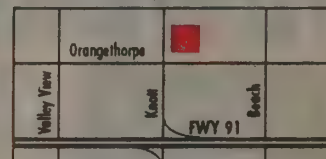
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CREATIVE TOOLS

does not always apply in the digital realm, where enhancements can often improve a document over the original. With Polaroid's specially designed CCD sensor, the CS-500 can make a 24-bit, 125dpi scan of a 4" x 6" photo in three seconds, or 500dpi in twelve seconds. The quality of the screen image is rich and detailed, and to the average eye, completely photorealistically natural.

Product intro demonstrations reveal a lot about a company's confidence in its technology. For instance, when I saw one of Sony's early demonstrations of the HDTV camera and displaysystem, the scene on the ultrawide monitor played it safe—just a grassy meadow, no major color contrasts, little motion, and zero people. Polaroid took the high ground with its demo, one of the most challenging subjects for any photographers worth their light meter. Three children—an Asian, a Caucasian, and an African American—in the same close shot. The results on the screen of the Mac after the scan showed a level of warm naturalism bordering on perceptual transparency—you're more aware of the subject than of the medium.

The key to the scanner's stunning performance with color photos is the CCD (Charge-Coupled Device) sensor and a custom ASIC (Application Specific Integrated Circuit) designed and prepared by Polaroid. Both Kodak and Polaroid are corporations that are almost "Japanese" in terms of deep investments in R&D and their commitment to long-range planning. Here, Polaroid's years of research in the nature of light and reflection have paid off.

The CS-500 will also do 8-bit grayscale, and resolutions of 500, 250, or 125dpi (dots per inch). The device comes with the appropriate software for the user's computer. For the Mac II, Polaroid SprintScan has preview mode, cropping, and realtime color image processing. An Adobe Photoshop plug-in is included, and SprintScan translates to TIFF, PICT, and RGB file formats. The CS-500i will be the next scanner model to be released. It will be compatible with both the Mac II and Windows/386SX machines.

POLAROID VS. KODAK

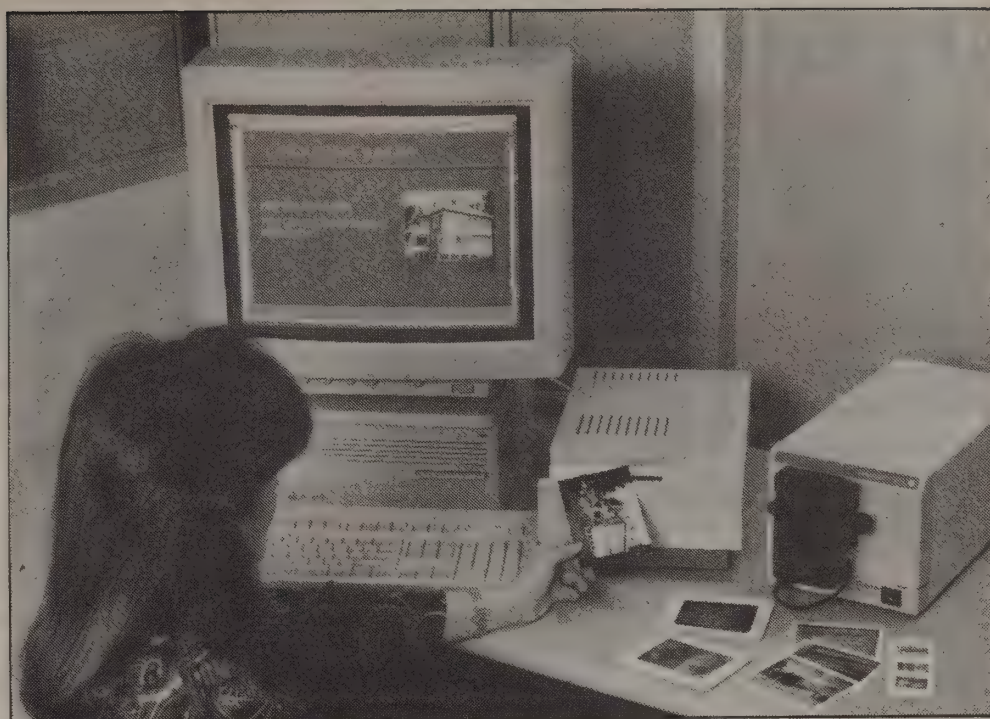
Should you get a Polaroid CS-500 instead of a 24-bit color flatbed scanner, or wait for Photo CDs?

The CS-500 is designed for a specific purpose, which it does very well. The SprintScan software allows for wide latitude in selecting and adjusting color values and levels, but—as with Light Source's Ofoto—most of the scans get it right the first time from most original photos.

In using a top-of-the-line 24-bit color desktop scanner like the Microtek ScanMaker 600ZS, I've found that with a great deal of tweaking you can get good screen results from a color print. Color matching devices such as those made by RasterOps and SuperMac, and Savitar's software-based matcher can help to match screen display to output device, but it's going to be hard to beat the specific engineering built into the CS-500 for that first scan.

If you draw your scans from a variety of original materials, however, the CS-500 can behave like a brick wall. Anything that will enter the 4" x 6" hopper and fit between the rollers will be scanned—if it fits. It's true that most hand-scanner scans are drawn from areas that size or smaller, but the subjects are usually scanned from books, catalogs, maps, and magazines, rather than conveniently trimmed rectangles.

The Polaroid CS-500 will be especially useful for volume work such as in publishing, corporate communications, medicine, science, ad-



Polaroid technology allows images to be easily scanned, manipulated, and placed in documents.

vertising, real estate, insurance, presentations, and image databases. Service bureaus should have them available soon, so even if your varied workload demands a good quality flatbed, you may run job-batches of snapshots through at a laser parlor.

Both Kodak's Photo CD system and the Polaroid system make high-resolution digital color images easy and affordable. One is built for durability, the other for speed. With the Photo CD, you may have to wait three days, but you end up with the images on a permanent optical storage medium with built-in multimedia capabilities. Nothing could be faster than the Polaroid: shoot the subject with one of their instant cameras, wait the minute or so for the print to "cook," slide it into the CS-500, and the image is on the screen, self-corrected and ready to drop into that deadline edition within a few minutes.

What's common to both Kodak and Polaroid is that, with the world's best state-of-the-art image digitizing technologies, their screen pictures depend upon mechanical cameras using silver-halide film. Both industrial giants have independently come to the same conclusion—that affordable, consumer-level high-resolution digital cameras are decades away. So for both, the field image capture device remains the hand-held 35mm or PolaChrome CS camera.

For us desktop producers, these tools offer many more options for including realistic photo images in any kind of work we do, and we will see much synergy between the Kodak and Polaroid systems mediated by the personal computer.

"PHOTOSCRIPT"

With Light Source's Ofoto for monochrome and Kodak's Photo CD and Polaroid's Digital Photo Scanner for color, the fully photorealistic image document, once found mostly in the graphics workstation environment, is now accessible at the average desktop. It may be seen as analogous to the introduction of PostScript for desktop publishing.

But there is not yet an analogous "PhotoScript"—a consistent file format that is generated at the device of origin. Each manufacturer generates documents in its own way, and one that can be easily translated for the Mac or PC desktop. What is consistent is the familiar, directly readable, "National Geographic-type" quality color photo.

Again, it should be emphasized that professionals using video capture boards, 24-bit color scanners, and other high-quality imaging products have already been achieving these levels of images at the desktop; the difference is that non-professionals can now enjoy a level of quality and consistency that has hitherto been elusive. No more "glass ceiling" for naturalistic photorealism. ■

RESOURCES:

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News, Tips, And Trivia

**BY DAVID
MORGENSTERN**

Hold on to your hat this month. There's news, tips, and trivia. Some consider these all different flavors of the same dish, but BMUGers can sort them out in quick time. News is fresh tips, while trivia is vintage news.

VIRUS R US

It's getting to be an unfortunate ritual in the BMUG office—the discovery of a new virus! The latest offering is an annoying piece of work called CODE 252.

CODE 252 is designed to trigger if an infected application is run; or system booted, between June 6 and December 31. When triggered, the virus brings up a dialog box with the message:

You have a virus.
Ha Ha Ha Ha Ha Ha Ha
Now erasing all disks...
Ha Ha Ha Ha Ha Ha Ha
P.S. Have a nice day.
Ha Ha Ha Ha Ha Ha Ha
(Click to continue...)

Despite this message, no files or directories are deleted, but a worried user might power-down the system on seeing the message. This action may corrupt the disk, leading to significant damage.

Under System 7, the System file can be seriously damaged by CODE 252 as the virus attempts to spread. This can lead to a system that refuses to boot, crashes, or exhibits other unusual behaviors. Of course, this mimics the usual behavior of some applications running in low-memory situations under System 7, so take your pick.

Between January 1 and June 5, the virus spreads from applications to system files, and then to other application files. Although most applications will not be affected by actions of the virus spreading, some applications have specific code to fight virus attacks. They may not work, or will warn you that they've been infected.

The version of Disinfectant that was written especially to treat this virus is v2.8. The latest version of Disinfectant can always be found on the BMUG Utilities V1 disk available from the BMUG office.

TUNEUPS AND DOWNS

Last month I explained in great detail the

problem of the Great System 7 Desktop Bug. Apple bug fixers must have been working overtime, because they came up with a fix. Sort of.

Last January, Apple sent out a set of updated system parts, called Tune-Up 1.0. It fixed some of the printer drivers and supposedly speeded some things up. In late March, the Cupertino systemware gurus released an update, Tune-Up 1.1. The street name for the update is the Tuner.

Tuner has a patch that will prevent you from catching the Desktop bug, but it can't fix your drive if you already have a corrupted system. Before you load the new extensions, you're supposed to run the Disk First Aid program and check your drive for the problem. If everything checks out fine, you immediately install the Tuner on the hard disk.

Tune-Up 1.1 modifies the System file by adding some INIT resources. These are inserted the first time you boot up running the Tuner extension. There is a block of ASCII text at the end of one of the resources which reads "Tuna Helper."

Once you've run Tune-Up, the fix code will always be there, even if you later turn off the Tuner extension by holding down the Shift key as you start up.

There's a trick with the Tune-Up updates. All you have to do is drop the Tune-Up Parts folder on your System folder. A dialog tells you that "these items need to be stored in special places in order to be available to the Macintosh." A very smart system folder. There's an Installer script included with the Tuner, because Apple user testing discovered that 40% of people couldn't get it right without the Installer. Read the instructions? Who, me?

Everything would have been the cat's pajamas, except that there were serious problems with Tune-Up 1.1. The program was compiled with the wrong version of a header file, causing the "Application Assassin" to crash. This is the code that brings up a dialog suggesting one application to Quit, allowing another application to run in low-memory situations.

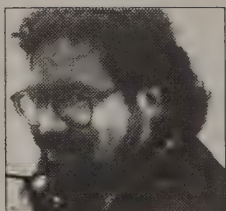
There are three memory numbers stored for every application: current, suggested, and minimum, which is invisible. The first two numbers are found in the Get Info box for the application. The third may be the same as the suggested amount, or it may be lower. With Tune-Up running, as long as there is more memory available than the minimum, you will not get a low-memory warning message.

Under System 7, the System file can be seriously damaged by CODE 252 as the virus attempts to spread. This can lead to a system that refuses to boot, crashes, or exhibits other unusual behaviors. Of course, this mimics the usual behavior of some applications running in low-memory situations under System 7, so take your pick.

The application will open, even though a further mouse-click may be too much for it to handle.

For example Excel 3.0 has a suggested 1,536K allocation, but a minimum of only 512K! As long as there's 512K available, Excel will launch, with Tune-Up. You may have only enough memory available to calculate Bill Gates' personal wealth on the day's stock market result—but the program will open.

Computer manufacturers have always had difficulty understanding the difference between *opening* programs and *using* them. We hear that a certain underpowered hard-



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CREATIVE TOOLS

ware configuration can "run" System 7 or other fancy applications. This is all marketing hype. Real-world use (the kind we specialize in at BMUG) always gives different results. You may be able to run, but not use the software.

I'm really bugged by the removal of the dialog, even if a study showed that the quit-to-free-up-memory dialog confused more users than it helped. It really acted as an early warning of a potential low-memory difficulty. Users move quickly back and forth between programs, performing related tasks. Without the early warning this might turn out to be a bad move, since not all applications handle low-memory gracefully. A word to the wise: Always remember to save your work before opening another application or desk accessory.

The faulty Tuner release also points out flaws with Apple testing. I've often felt that everyone at Apple appears to be flush with memory. If the Tuner was being pounded on machines with 2.5 to 4MB of RAM, wouldn't they have uncovered the bug?

The corrected Tuner release is v1.1.1 and is available from the BMUG office.

THAT TINGLING FEELING

Have you been spending a little too much time at the

What Is BMUG?

BMUG is an educational, nonprofit, consumer advocacy group organized to share information and provide critical direction to users and developers in the computer community worldwide. It is an independent advocate, not affiliated with any manufacturer, delivering trustworthy information and useful products.

Like any growing organization, it is many different things to its thirteen thousand international members. BMUG supports many Special Interest Groups (SIGs), a Bulletin Board System (BBS), free HelpLine, software library, weekly meetings, publications, and much more. BMUG also puts out a semiannual 400+ page book that we call our "newsletter."

Our motto continues to be: *We're in the business of giving away information.*

Come and join in the dialogue at the BMUG main meeting every Thursday evening, 6–9 pm (or whenever we finish), in the Physical Sciences Lecture Hall on the UC campus. BMUG West is a meeting held monthly in the Exploratorium, San Francisco's science museum.

The BMUG Office, 2055 Center St. (a half block from the BART station), is open to the public 9 am to 5 pm. Please come by and say hello, meet other members, and hang out.

The BMUG HelpLine, (510)540-1742, and our fax number, (510)849-9026, provide technical assistance and telephonic hand-holding during business hours (11 am–5 pm). If your question can't be answered on the spot, we try to get you in touch with someone who can help. Of course, not every problem can have a happy ending—but we try.

BMUG has one of the most up-to-date, comprehensive software libraries around with hundreds of disks filled with the latest versions of public domain or shareware programs and HyperCard stacks. New disks are unveiled almost every week at the Thursday general meeting. BMUG also brings you the *TV-ROM™*, a fantastic collection of public domain QuickTime videos.

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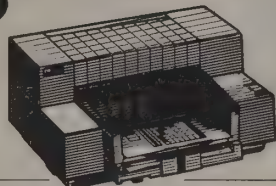
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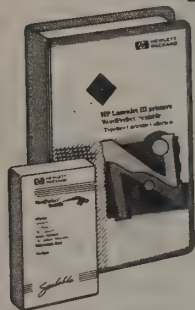
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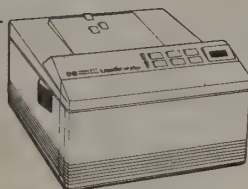
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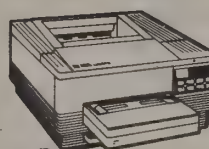
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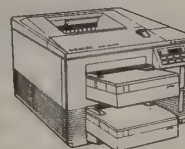
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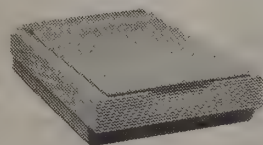
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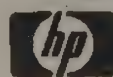
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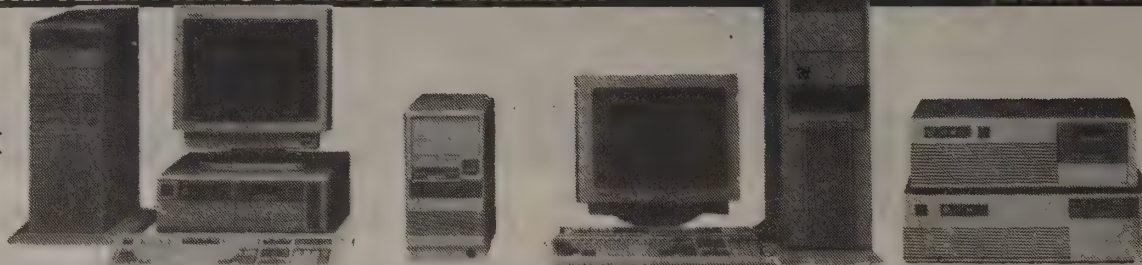
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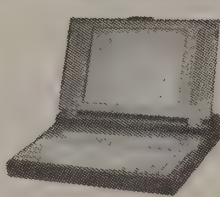
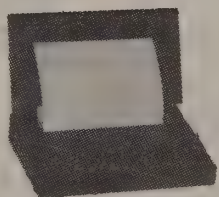
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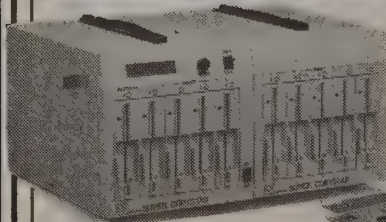
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computer? I know that sometimes I feel a bit of Carpal Tetris Syndrome starting to nibble at my hands. Al and Tana Brinnand of MouseMitt International have done something about it.

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These gloves are not therapeutic devices, but are preventive measures to keep you out of the doctor's office. I like the extra-padded Keyboarders, since I have very lazy wrists. The MouseMitt lists for \$10.95 each and the Keyboarders are \$25 a set. You can reach them at (408)335-9599 or fax (408)335-9598.

TRIVIALIZATION PROCLAMATION

Here we go again—the Second Annual MacTrivia Test (Part One). Amaze your friends, coworkers, parents, and even yourself! And if you can't answer a single question, please don't let it injure your self-esteem. It's not an I.Q. test, and is purposely skewed to favor the hard-core Macintosh nut. This is unfortunately only the trivial tip of the iceberg, and there will be lots more next month.

ANCIENT-ISH HISTORY

1)The original 128K Macintosh came with an audio tape, *Guided Tour of the Macintosh*. Who provided the musical interludes for the cassette?

2)Apple decided on a one-button mouse because:

a)it made the system easy to use for a novice.

b)it made the documentation easier to write.

c)the designers needed new eyeglass prescriptions and thought there really were two buttons on the mouse.

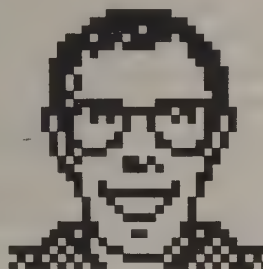
3)Which of the following was a source of pride to members of the Macintosh design team as reported in the first issue of *MacUser* magazine, October 1985?

a)Granola and alfalfa sprouts were still offered in the Apple cafeteria even though Steve Jobs was no longer with the company.

b)Some brave programmers were using the Mac to write Macintosh programs.

c)People were buying the 512K Macintosh, even though it was called "Fat."

4) Who is this?

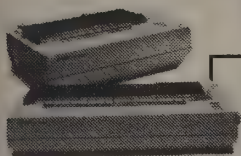


5) Here is a column of Macintosh products and products-to-be. Match them with their code-names.

32-bit QuickDraw
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Casper

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Pen-based computer	976

ANSWERS—NO CHEATING!

1) The tinkling piano music was from George Winston of Windham Hill Records. The Tour cassette also betrays an unfortunate early form of Mac-speak. It says that "This is the guided tour of Macintosh." Not "Macintosh computer," or "the Macintosh." Just Macintosh—lifestyle, religion, and toaster.

2) b) Jef Raskin, the original head of the Macintosh project, says categorically that making the mouse easier for new users was not the reason. He had observed at PARC that he and other "expert" users often made mouse button errors. When he designed the Macintosh interface at Apple, he listed the tasks mice had to perform, and found paradigms that would work with one, two—and zero—buttons!

"The button" was clearly the simplest and just happened to be easier to teach (and write documentation for). He said that his original design did not require double-clicks and that "feature" was added later, after he left Apple.

Jef said, "What I was blind to was the still better idea of labeling the mouse buttons. All mice at the time had unlabeled buttons, and I unthinkingly followed the trend."

The concept of different sizes and shapes of buttons has only

recently become popular. The new chording keyboards, like the BAT keyboard (as seen on the latest BMUG Macworld Tour video), have a few differently shaped buttons which help give the user touch-based clues to avoid errors.

3) b) When the Macintosh first hit the streets, if you wanted to use a Mac to create programs for itself, you were out of luck. There was no Mac-based Macintosh programming language—it was all done on the Lisa, or on larger computers, and then ported over to the Mac. A year and a half later there were plenty of choices, helped out by the emergence of expensive memory upgrades and hard disk drives.

4) You might not recognize him in his icon form. It's Bill Atkinson, genius programmer, former Apple Fellow, and creator of QuickDraw, MacPaint, and HyperCard. He's down at General Magic, hopefully helping to make the next wave of personal computing devices.

5) 32-bit QuickDraw=Jackson Pollack, AppleScript=Cheez Whiz (unreleased), QuickTime=Project Warhol (an early version of the extension had the icon of a Campbell's soup can), AppleShare 3.0=Holy Hand Grenade (The System 7 File Sharing Extension's creator is "hhgg." Some think this is a continued reference to the Monty Python Holy Grail movie, where it was called the Holy Hand Grenade of Antioch. But others think it's the initials of the Hitchhiker's Guide to the Galaxy. Whichever you're a fan of can be your choice.), HyperCard 1.0=WildCard (the creator of a stack is "wild"), AppleTalk Remote Access=976 (that's the US phone-sex area code), Speech Recognition=Casper (unreleased), Pen-Based Computer=Newton (just-announced product). ■

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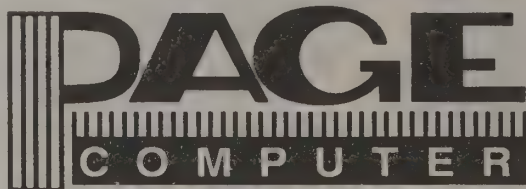
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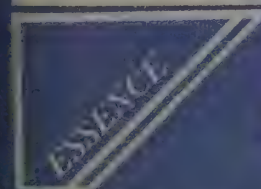
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- 1.2MB & 1.44MB Teac Floppy Drives
- 210MB 15ms IDE Hard Drive w/64KB Cache
- 2 Serial/1 Parallel & 1 Game Ports
- Focus 5001 Keyboard
- 250 Watts UL Power Supply
- Mid size Tower Case with Double fan
- MicroSoft Windows & MS DOS 5.0
- Hi-Resolution Mouse

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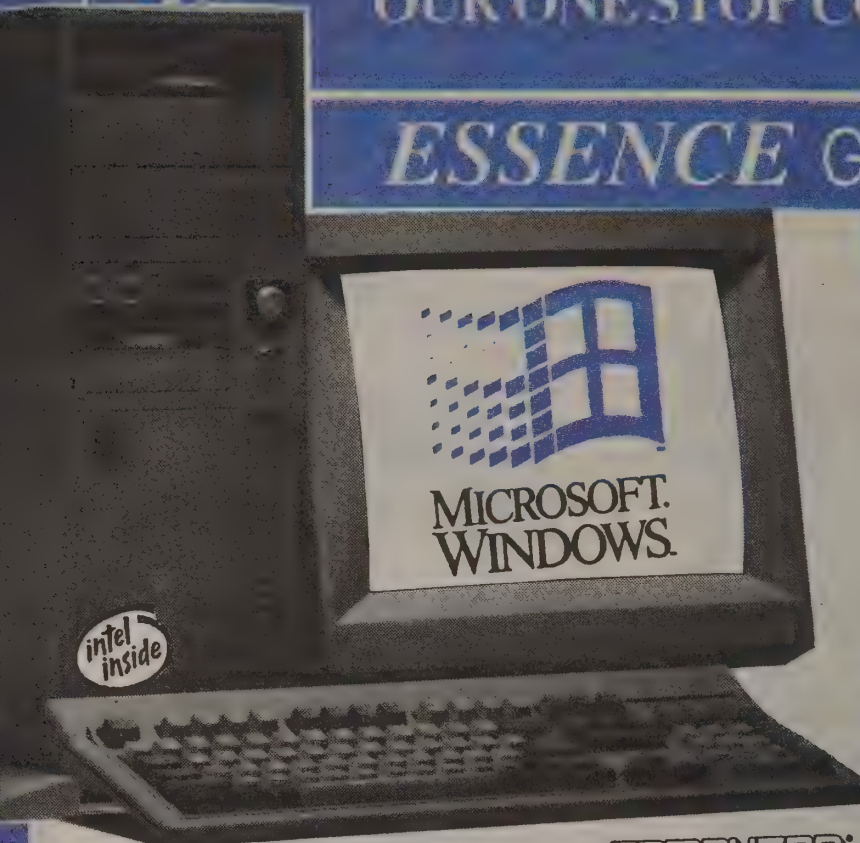
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486DX-33V \$1035.00(995.00)

- VEGA 486DX-33MB
- Intel 80486DX-33 Microprocessor
- Built-On Math coprocessor
- 64K High Speed Cache Memory
- Expandable to 8MB/16MB/32MB/64MB
- One TEAC 1.2MB (or 1.44MB) Floppy Drive
- IDE Floppy/Hard Disk Controller
- 2 Serial/1 Parallel
- Mid Vertical Case
- 250 Watts UL Power Supply
- Focus 6000 keyboard
- 256K Cache +\$55.00

486DX2-50V \$1135.00(1195.00)

486DX-50V \$1428.00(1335.00)

- VEGA 486DX2-50/DX-50MB
- Intel 80486DX2-50/DX-50 Microprocessor
- Built-On Math coprocessor
- 256K High Speed Cache Memory
- 4MB Memory on Board (60ns)
- Expandable to 8MB/16MB/32MB/64MB
- One TEAC 1.2MB (or 1.44MB) Floppy Drive
- IDE Floppy/Hard Disk Controller
- 2 Serial/1 Parallel
- Mid Vertical Case
- 250 Watts UL Power Supply
- Focus 6000 keyboard

486DX-33U \$995.00(955.00)

486DX2-50U \$1195.00(1155.00)

486DX-50U \$1355.00(1295.00)

- UMC 486DX-33/DX2-50/DX-50MB
- Intel 80486DX-33/DX2-50/DX-50 Microprocessor
- Built-On Math Coprocessor
- 64K High Speed Cache Memory
- Expandable to 256K (256K for 50MHz)
- 4MB Memory on Board
- Expandable to 8MB/16MB/32MB/64MB
- One TEAC 1.2MB (or 1.44MB) Floppy Drive
- IDE Floppy/Hard Disk Controller
- Mid Vertical Case
- 250 Watts UL Power Supply
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386DX-33 \$595.00(575.00)

386DX-40 \$605.00(585.00)

- 80386DX-33/40 Microprocessor
- 64K High Speed Cache Memory
- 4MB Memory on Board
- Expandable to 8MB/16MB/32MB
- One TEAC 1.2MB (or 1.44MB) Floppy Drive
- IDE Floppy/Hard Disk Controller
- 2 Serial/1 Parallel
- Mini Vertical Case
- 220 Watts UL Power Supply
- Focus 6000 keyboard

386SX-16 \$350.00(340.00)

386SX-25 \$370.00(350.00)

- 80386SX-16/25 Microprocessor
- 1MB Memory on Board
- Expandable to 8MB/16MB
- One TEAC 1.2MB (or 1.44MB) Floppy Drive
- IDE Floppy/Hard Disk Controller
- 2 Serial/1 Parallel
- Mini Vertical Case
- 220 Watts UL Power Supply
- Focus 6000 keyboard

386DX-25 \$460.00(445.00)

- 80386DX-25 Microprocessor
- 1MB Memory on Board
- Expandable to 2MB/4MB/8MB
- One TEAC 1.2MB (or 1.44MB) Floppy Drive
- IDE Floppy/Hard Disk Controller
- 2 Serial/1 Parallel
- Mini Tower case
- 220 Watts UL Power Supply
- Focus 6000 keyboard

HARD DISK SUBSYSTEM UPGRADES:

CASH PRICE

40MB (IDE)	+\$200.00(193.00)	120MB (IDE)	+\$353.00(340.00)
80MB (IDE)	+\$290.00(270.00)	200MB (IDE)	+\$525.00(505.00)

REFER TO OTHER PAGE FOR ADDITIONAL
HARD DISK DRIVES SELECTIONS!

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12" Monochrome Monitor	
w/MonoGraphics Card	+\$96.00(92.00)
14" Monochrome Monitor	
w/MonoGraphics Card	+\$115.00(111.00)
14" Mono VGA (Paper-white) Monitor	
w/16 bit VGA Card	+\$163.00(158.00)
14" ViewSonic 1 VGA Monitor (39dp)	
w/TVGA-9000 (256K)	+\$285.00(273.00)
14" CTX 5468 Super VGA Monitor (28dp)	
w/TVGA-8900C 1MB VGA Card	+\$365.00(350.00)
14" CTX 5468NI Non-Interlaced Monitor (28dp)	
w/TVGA-8900C 1MB VGA Card	+\$400.00(385.00)
14" ViewSonic 6E Non-Interlaced Monitor (28dp)	
w/TVGA-8900C 1MB VGA Card	+\$420.00(405.00)
w/Orchid Pro-Designer II (1MB)	+\$490.00(470.00)
14" ViewSonic 5E Non-Interlaced Monitor (28dp)	
w/ATI VGA Wonder XL (1MB)	+\$580.00(555.00)
w/Orchid Pro-Designer IIs (1MB)	+\$585.00(560.00)

Call for your complete Monitors Price List

15" ViewSonic 6FS Non-Interlaced Monitor (28dp)	
w/ATI VGA wonder XL (1MB)	+\$785.00(755.00)
w/Orchid Pro-Designer IIs (1MB)	+\$790.00(760.00)
w/Orchid Fahrenheit 1280 (1MB)	+\$870.00(835.00)
17" ViewSonic 7 Digital Auto-Tracking Monitor (28dp)	
w/Orchid Fahrenheit 1280 (1MB)	+\$1369.00(1310.00)
w/ATI Graphics Vantage (1MB)	+\$1375.00(1325.00)
w/ATI Graphics Ultra (1MB)	+\$1535.00(1475.00)

WITH SYSTEM:

Microsoft DOS 5.0	+\$37.00
Microsoft Windows 3.1 w/Mouse	+\$55.00
Internal 2400 Baud Data Modem	+\$36.00
Internal 9600 Baud Fax Modem	+\$66.00

HARD DISK SUBSYSTEM WITH SYSTEM

40MB (IDE)	+\$200.00(193.00)
80MB (IDE)	+\$280.00(270.00)
120MB (IDE)	+\$353.00(340.00)
200MB (IDE)	+\$525.00(505.00)

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Orchid SuperBoard 486DX-50MHz M/B w/256K Cache (Local Bus)	\$1250.00(1200.00)
Orchid SuperBoard 486DX-33MHz M/B w/64K Cache (Local Bus)	\$780.00(750.00)
VEGA Baby 486DX-50MHz EISA M/B w/256K Cache (USA made)	\$1390.00(1340.00)
VEGA Baby 486DX-33MHz EISA M/B w/64K Cache (USA made)	\$1030.00(990.00)
VEGA Baby 486DX-50MHz M/B w/256K Cache (USA made)	\$960.00(930.00)
VEGA Baby 486DX-33MHz M/B w/256K Cache (USA made)	\$850.00(820.00)
VEGA Baby 486DX-50MHz M/B w/64K Cache (USA made)	\$645.00(620.00)
UMC Baby 486DX-50MHz M/B w/256K Cache (Write-back cache)	\$925.00(890.00)
UMC Baby 486DX-33MHz M/B w/64K Cache (Write-back cache)	\$810.00(780.00)
UMC Baby 486DX-50MHz M/B w/256K Cache (Write-back cache)	\$605.00(585.00)
OPTI Baby 486DX-50MHz M/B w/256K Cache (Write-back cache)	\$925.00(890.00)
OPTI Baby 486DX-33MHz M/B w/256K Cache (Write-back cache)	\$810.00(780.00)
OPTI Baby 486DX-50MHz M/B w/64K Cache (Write-back cache)	\$600.00(580.00)
OPTI Baby 386DX-40MHz M/B w/64K Cache (Write-back cache)	\$265.00(255.00)
UMC Baby 386DX-40MHz M/B w/64K Cache (Write-back cache)	\$265.00(255.00)
C & T Baby 386DX-40MHz M/B w/64K Cache	\$275.00(265.00)
OPTI Baby 386DX-33MHz M/B w/64K Cache (Write-back cache)	\$260.00(250.00)
C & T Baby 386DX-33MHz M/B w/256K Cache	\$265.00(260.00)
*** 256K Cache upgrade for all 486 and 386 MB	
OPTI Baby 386DX-25MHz M/B	\$200.00(193.00)
Symphony Mini 386DX-25MHz M/B (max 32MB on board)	\$205.00(198.00)
C & T Mini 386SX-25MHz M/B	\$157.00(152.00)
Headland Mini 386SX-25MHz M/B	\$150.00(145.00)
Headland Mini 386SX-16MHz M/B	\$132.00(127.00)

ADD-ON BOARDS

Regular / CASH
Pricing / PRICE

MonoGraphics/Printer Card	\$16.00(15.00)
TVGA-9000 VGA Card w/256K (Trident 9000 Chipset upto 512K)	\$45.00(43.00)
TVGA-8900C 1MB SuperVGA Card (Trident 8900C Chipset)	\$75.00(72.00)
PVGA-1C VGA Card w/256K (Paradise WD90C11 Chipset upto 512K)	\$56.00(54.00)
PVGA-1D SuperVGA Card (Paradise WD90C30 Chipset)	\$89.00(86.00)
ET-4000 1MB VGA Card (Tseng Lab ET-4000 Chipset)	\$103.00(99.00)
ET-4000HC 1MB VGA Card w/Sierra Hi-Color Chip (32,768 colors)	\$125.00(120.00)
ATI VGA Wonder XL VGA Card (32,768 colors, OEM Version)	\$165.00(159.00)
ATI VGA Wonder XL VGA Card w/Mouse (OEM Version)	\$195.00(188.00)
ATI Graphics Vantage 1MB VGA Card w/Mouse (OEM package)	
- 11 times faster than SuperVGA cards, 1280x1024	\$265.00(255.00)
ATI Graphics Ultra 1MB (VRam) VGA Card w/Mouse (OEM package)	
- 24 times faster than SuperVGA cards, 1280x1024	\$420.00(405.00)
Diamond SpeedStar 1MB VGA Card w/H-Color Chip	\$190.00(183.00)
Diamond Stealth 1MB (VRam) Window Accelerator w/H-Color Chip	\$275.00(265.00)
Orchid Pro-Designer II 1MB VGA Card (72Hz refresh rate @ 800x600)	\$148.00(143.00)
Orchid Pro-Designer II 1MB VGA Card w/Sierra RAMDAC (32,768 colors)	
- 70Hz refresh rate @ 1024x768	\$180.00(173.00)
Orchid Fahrenheit 1280 1MB (VRam) Graphics Accelerator w/Sierra RAMDAC	
- 32,768 colors, 12 times faster than SuperVGA cards, 1280x1024	\$275.00(265.00)
ATI IO (2 Serial 1 Parallel 1 Game) Card	\$16.00(15.00)
Parallel (Printer) Card	\$10.00(10.00)
Game Card (Dual ports)	\$11.00(11.00)
AT IDE Adapter (Dual floppy & hard disk) w/Cable	\$17.00(16.00)
AT Super IDE IO Adapter (Dual floppy & hard disk, 2S, 1P, 1G)	\$26.00(25.00)
UltraStor 12F 1.1 ESDI Floppy/Hard Disk Controller	\$155.00(149.00)
UltraStor 12F 24 1.1 (24MB/s) ESDI Floppy/Hard Disk Controller	\$190.00(183.00)
UltraStor 12C ESDI Caching FDHD Controller w/1MB (upto 16MB)	\$435.00(418.00)
UltraStor 15C IDE Caching FDHD Controller w/1MB (upto 8MB)	\$265.00(255.00)
Future Domain 850 8-bit SCSI Hard Disk Controller	\$66.00(64.00)
Future Domain 1670 16-bit SCSI Floppy/Hard Disk Adapter Kit	\$164.00(158.00)
Always IN-2000 16-bit SCSI Hard Adapter (Novell certified)	\$196.00(189.00)
ADAPTEC AHA-1542B SCSI Floppy/Hard Disk Adapter (card only)	\$239.00(240.00)
ADAPTEC AHA-1542BK SCSI Bus Master Host Adapter Kit	\$289.00(278.00)
*** EISA Controller for SCSI, ESDI, IDE	

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CS-20 Baby AT Case w/200W UL P.S. (3x5.25", 2x3.5")	\$84.00(81.00)
CS-22 Slim Line Case w/200W UL P.S. (2x5.25", 2x3.5")	\$87.00(84.00)
CS-35 Mid Vertical Case w/230W UL P.S. (3x5.25", 3x3.5", Digital)	\$110.00(106.00)
CS-36 Full Vertical Case w/230W UL P.S. (6x5.25", 2HD, Digital)	\$137.00(132.00)
CS-D2 Baby AT Case w/200W P.S. (3x5.25", 1x3.5")	\$70.00(67.00)
CS-M1 Mini Vertical Case w/200W P.S. (2x5.25", 3x3.5", Digital)	\$70.00(67.00)
CS-M2 Mini Vertical Case w/200W P.S. (2x5.25", 3x3.5")	\$68.00(65.00)
CS-931 Mini Vertical Case w/200W P.S. (2x5.25", 3x3.5", Digital)	\$73.00(70.00)
CS-923 Mid Vertical Case w/200W P.S. (3x5.25", 3x3.5", Digital)	\$94.00(91.00)
CS-912 Full Vertical Case w/230W UL P.S. (4x5.25", 2HD, Digital)	\$125.00(120.00)
Diamond Series: (Black color model available - \$3.00)	
CS-130 Full Vertical Case w/250W UL P.S. (4x5.25", 2HD, Digital)	\$156.00(150.00)
CS-230 Mid Vertical Case w/250W UL P.S. (4x5.25", 2HD, Digital)	\$146.00(140.00)
CS-330 Mini Vertical Case w/220W UL P.S. (2x5.25", 3x3.5", Digital)	\$90.00(87.00)
CS-330 Desktop Case w/250W UL P.S. (2x5.25", 2x3.5", 2HD, Digital)	\$103.00(99.00)
CS-730 Baby AT Case w/250W UL P.S. (2x5.25", 1x3.5", 1HD, Digital)	\$94.00(91.00)
CS-830 Slim Line Case w/220W UL P.S. (1x5.25", 1x3.5", 1HD, Digital)	\$90.00(87.00)

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TEAC 1.44MB FDD (3.5") w/Mounting Kit	\$58.00(55.00)
TEAC 2.88MB FDD (3.5") w/Mounting Kit & Controller	\$168.00(162.00)
Panasonic 1.2MB FDD (5.25")	\$59.00(56.00)
Panasonic 1.44MB FDD (3.5") w/Mounting Kit	\$55.00(52.00)
Conner CP-3000 40MB IDE HDD (29ms)	\$205.00(198.00)
Conner CP-3008 80MB IDE HDD (17ms)	\$280.00(270.00)
Conner CP-30104 120MB IDE HDD (17ms)	\$353.00(340.00)
Conner CP-3204F 210MB IDE HDD (16ms)	\$565.00(544.00)
Maxtor MX-7080A 80MB IDE HDD (17ms)	\$285.00(275.00)
Maxtor MX-7080S 80MB SCSI HDD (17ms)	\$285.00(275.00)
Maxtor MX-7120A 120MB IDE HDD (15ms)	\$353.00(340.00)
Maxtor MX-7120S 120MB SCSI HDD (15ms)	\$353.00(340.00)
Maxtor MX-7213A 213MB IDE HDD (15ms)	\$525.00(505.00)
Maxtor MX-7213S 213MB SCSI HDD (15ms)	\$525.00(505.00)
Maxtor LXT-340A 340MB IDE HDD (13ms)	\$850.00(820.00)
Maxtor LXT-340S 340MB SCSI HDD (13ms)	\$930.00(895.00)
Maxtor XT-8380E 338MB ESDI HDD (13.5ms)	\$1025.00(990.00)
Maxtor XT-8380S 337MB SCSI HDD (13.5ms)	\$1025.00(990.00)
Maxtor XT-8760E 676MB ESDI HDD (16.5ms)	\$1395.00(1340.00)
Maxtor XT-8760S 675MB SCSI HDD (16.5ms)	\$1395.00(1340.00)
Maxtor PO-12 1.2GB SCSI HDD (13ms)	\$1780.00(1720.00)
Quantum LPS52AT 52MB IDE HDD (17ms, 64K cache buffer)	\$245.00(236.00)
Quantum LPS84AT 84MB IDE HDD (17ms, 64K cache buffer)	\$295.00(285.00)
Quantum LPS105AT 105MB IDE HDD (17ms, 64K cache buffer)	\$335.00(325.00)
Quantum LPS12A012 120MB IDE HDD (17ms, 256K cache buffer)	\$360.00(345.00)
Quantum LPS24A012 240MB IDE HDD (15ms, 256K cache buffer)	\$625.00(600.00)
Seagate ST-351AX 42MB IDE HDD (28ms)	\$200.00(193.00)
Western Digital AC280 80MB IDE HDD (17ms)	\$285.00(275.00)
Western Digital AC2120 120MB IDE HDD (15ms)	\$360.00(345.00)
Western Digital AC2200 200MB IDE HDD (13ms)	\$580.00(558.00)
SyQuest SQ255 44MB SCSI Removable Disk Drive	\$305.00(293.00)
SyQuest SQ5110 88MB SCSI Removable Disk Drive	\$445.00(428.00)
SyQuest SQ400 44MB Cartridge	\$75.00(73.00)
SyQuest SQ800 88MB Cartridge	\$108.00(104.00)
SyQuest SQ01 SCSI Adapter w/Software (for internal drive only)	\$45.00(43.00)

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Focus-2001 101keys Keyboard w/Hard Disc Cover (Click)	\$44.00(42.00)
Focus-5001 130keys Keyboard (Dble function keys, calculator, etc.)	\$60.00(58.00)
Focus-6000 101keys Keyboard (Soft click)	\$38.00(37.00)
Focus-7000 108keys Keyboard (Diagonal Arrows keys, Soft click)	\$40.00(39.00)
Focus-8000 111keys Keyboard (Calculator, Soft click)	\$46.00(45.00)
Focus-9000 128keys Keyboard (Programmable, same as 5001 K/B)	\$72.00(70.00)
Fujitsu-4700 101keys Keyboard	\$47.00(45.00)
Honeywell-101WN 101keys Keyboard (3yr. warranty)	\$40.00(38.00)
KT-2000 101keys Keyboard (Keytronic made)	\$45.00(44.00)

MONITORS

Regular / CASH
Pricing / PRICE

CTX5439A 14" SuperVGA Color Monitor (1024x768, 39dp)	\$255.00(245.00)
CTX5468A 14" SuperVGA (TrisScan) Color Monitor (1024x768, 29dp)	\$292.00(280.00)
CTX5468N 14" Non-Interlaced Color Monitor (1024x768, 29dp)	\$330.00(318.00)
CTX1760 17" Flat-Screen Multi-Freq Monitor (1280x1024, 29dp)	\$1070.00(1030.00)
NEC MultiSync 3FG 15" Color Monitor (1024x768, 29dp)	\$670.00(645.00)
NEC MultiSync 4FG 15" Color Monitor (AccuColor & Digital Controls 1024x768, 29dp)	\$780.00(750.00)
NEC MultiSync 5FG 17" Color Monitor (AccuColor & Digital Controls 1280x1024, 29dp)	\$1480.00(1425.00)
NEC MultiSync 6FG 21" Color Monitor (AccuColor & Digital Controls 1280x1024, 29dp)	\$2980.00(2865.00)
Sony CPD-1304S 14" MultiScan Monitor (Non-Interlaced, 25dp)	\$595.00(572.00)
Sony CPD-1604S 17" MultiScan Monitor (Non-Interlaced, 25dp)	\$1120.00(1075.00)
Suziaba SD-212A 12" Amber Monochrome Monitor	\$80.00(77.00)
Suziaba SD-414A 14" Amber Monochrome Monitor	\$99.00(95.00)
Suziaba SD-414VFM 14" Paper-white MonoVGA Monitor	\$118.00(113.00)
ViewSonic 1 14" VGA Color Monitor (640x480, 39dp)	\$240.00(230.00)
ViewSonic 2 14" VGA Color Monitor (640x480, 28dp)	\$295.00(284.00)
ViewSonic 4E 14" SuperVGA Color Monitor (1024x768, 29dp)	\$320.00(308.00)
ViewSonic 6 14" Non-Interlaced Color Monitor (1024x768, 29dp)	\$360.00(345.00)
ViewSonic 6E 14" Non-Interlaced Color Monitor (1024x768, 29dp)	\$350.00(337.00)
ViewSonic 5E 14" Non-Interlaced Color Monitor (1024x768, 29dp 72Hz refresh rate @ 1024x768)	\$418.00(400.00)
ViewSonic 5+ 14" Non-Interlaced Color Monitor (1024x768, 25dp Trinitron tube, 70Hz refresh rate @ 1024x768)	\$520.00(500.00)
ViewSonic 6FS 15" Multi-Frequency Color Monitor (Flat-Screen, Low radiation, 1280x1024, 29dp, 72Hz refresh rate @ 1024x768)	\$625.00(600.00)
ViewSonic 7 17" Multi-Frequency Color Monitor (Digital Auto-Tracking Flat-Screen, Low radiation, 1280x1024, 29dp)	\$1120.00(1080.00)
ViewSonic 8 20" Multi-Frequency Color Monitor (Digital Auto-Tracking Low radiation, 1280x1024, 29dp)	\$1655.00(1595.00)

PRINTERS

Regular / CASH
Pricing / PRICE

Citizen 200GX Printer (9pin/213cps/80col/color option)	\$168.00(162.00)
Citizen GSX-130 Printer (24pin/180cps/80col/color option)	\$241.00(232.00)
Citizen GSX-140+ Printer (24pin/220cps/80col/color option)	\$296.00(285.00)
Citizen GSX-145 Printre (24pin/192cps/132col/color option)	\$378.00(364.00)
*** Color Kit for Citizen 200GX, GSX-130 or GSX-140+	
Hewlett Packard DeskJet 500 Inkjet Printer	\$425.00(409.00)
Hewlett Packard DeskJet 500C Color Inkjet Printer	\$727.00(699.00)
Hewlett Packard IIP Plus Laser Printer	\$837.00(805.00)
Hewlett Packard IIP Laser Printer	\$1055.00(1015.00)
Hewlett Packard III Laser Printer	\$1545.00(1485.00)
Panasonic KX-P1180i Printer (9pin/240cps/80col)	\$159.00(154.00)
Panasonic KX-P1123 Printer (24pin/240cps/80col)	\$199.00(192.00)
Panasonic KX-P1124i Printer (24pin/300cps/80col)	\$289.00(279.00)
Panasonic KX-P1624 Printer (24pin/192cps/132col)	\$354.00(340.00)
Panasonic KX-P2180 Quiet Printer (9pin/240cps/80col/color option)	\$179.00(172.00)
Panasonic KX-P2123 Quiet Printer (24pin/240cps/80col/color option)	\$249.00(239.00)
Panasonic KX-P2124 Quiet Printer (24pin/320cps/80col/color option)	\$308.00(297.00)
Panasonic KX-P2624 Quiet Printer (24pin/300cps/132col)	\$398.00(385.00)
*** Color Kit for Panasonic KX-P2180, KX-P2123 or KX-P2124	
Panasonic KX-P4410 Laser Printer (5ppm/512K/300dpi)	\$649.00(635.00)
Panasonic KX-P4430 Laser Printer (5ppm/1MB/300dpi)	\$899.00(875.00)
Star NX-1001 Multi-Font Printer (9pin/180cps/80col)	\$139.00(135.00)
Star NX-1020R Color Printer (9pin/180cps/80col)	\$179.00(175.00)
Star NX-2430 Multi-Font Printer (24pin/250cps/80col)	\$244.00(235.00)
Star NX-2420R Rainbow Color Printer (24pin/250cps/80col)	\$289.00(278.00)
Star SJ-48 Stalejet Inkjet Printer (4lbs, 166cps, 360dpi)	\$308.00(296.00)

POWER SUPPLIES

Regular / CASH
Pricing / PRICE

XT-150W Power Supply	\$34.00(32.00)
Mini-AT 200W Power Supply (XT-size)	\$40.00(38.00)
AT-200W Power Supply (Full size)	\$42.00(40.00)
PS-2 200W UL Power Supply (for Mini-Tower or Baby-AT cases)	\$45.00(43.00)
PS-2 230W UL Power Supply (for Mini-Tower or Baby-AT cases)	\$48.00(46.00)

MISCELLANEOUS

Regular / CASH
Pricing / PRICE

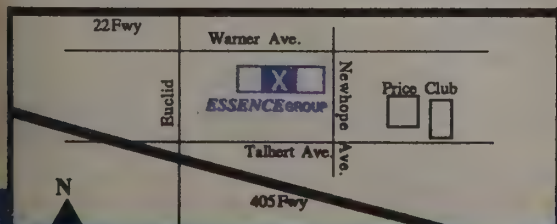
Mitsumi Internal CD-ROM w/Controller	\$265.00(255.00)
Sony Internal CD-ROM Drive w/Controller	\$348.00(335.00)
Sony External CD-ROM Drive w/Controller	\$388.00(375.00)
*** CD Package - Illustrated Encyclopedia, National Geographic, Reference Library, US Atlas / World Atlas, CD Game Pack II	
Sound Card w/Speakers (Ad-Lib compatible)	\$75.00(72.00)
Logitech Dextra Mouse	\$28.00(27.00)
Logitech First Mouse	\$42.00(39.00)
Logitech Serial MouseMan	\$58.00(56.00)
Logitech Bus MouseMan	\$70.00(68.00)
Logitech PS-2/Serial Combo MouseMan	\$70.00(68.00)
Logitech Serial Trackman	\$65.00(63.00)
Logitech Bus Trackman	\$76.00(73.00)
Logitech ScanMan 32 (Hand-held Scanner)	\$148.00(144.00)
Logitech ScanMan 256 (Grey Scale Scanner)	\$265.00(255.00)
Logitech ScanMan 256 w/Perceive Personal OCR Software	\$310.00(298.00)
MicroSoft Serial Mouse	\$89.00(86.00)
MicroSoft Bus Mouse	\$89.00(86.00)
AryMouse AX300 Serial Mouse w/Mouse Pad & Pocket	\$21.00(20.00)
TrueDox TrackBall (Serial)	\$35.00(34.00)
Z-Nix SuperMouse w/MicroSoft Windows 3.1	\$65.00(64.00)
Smart-One Internal 2400 Baud Data Modem	\$44.00(42.00)
Smart-One External 2400 Baud Data Modem	\$67.00(65.00)
Smart-One Internal 9600/4800/2400 Send/Receive Fax/Data Modem	\$80.00(78.00)
U.S. Robotics Sportster 2400PC Internal Data Modem	\$138.00(134.00)
U.S. Robotics Sportster 2400 External Data Modem	\$149.00(144.00)
U.S. Robotics Sportster 9600PC Internal Data Modem (V.32/V.42bis)	\$418.00(402.00)
U.S. Robotics Sportster 9600 External Data Modem (throughput to 38,400bps)	\$452.00(435.00)
U.S. Robotics Courier HST External Modem (V.42 & V.42bis)	\$562.00(545.00)
U.S. Robotics Courier HST Dual STD External Modem	
- Asymmetric HST Module, V.32bis	\$798.00(770.00)
Zoltrix 2400i Internal 2400Baud Data Modem	\$40.00(39.00)
Zoltrix Integra Internal 9600/4800/2400 Send/Receive Fax/Data Modem	\$76.00(74.00)
Zoltrix Standard Internal 9600/2400 Send/Receive Fax/Data Modem	\$89.00(86.00)
Zoltrix Enhanced Internal 9600/2400 Send/Receive Fax/Data Modem	
- with Hardware MNP5 & V.42bis	\$110.00(106.00)
Zoltrix Pocket 9600/2400 Send/Receive Fax/Data Modem	\$94.00(91.00)
Zoltrix 9600i Internal 9600 Baud Data Modem w/MNP5 & V.42bis	\$265.00(255.00)
Zoltrix 9600e External 9600 Baud Data Modem w/MNP5 & V.42bis	\$295.00(285.00)
Colorado Memory System DJ-10 120MB Tape Backup System	\$198.00(192.00)
Colorado Memory System DJ-20 250MB Tape Backup System	\$262.00(258.00)
Colorado Memory System AB-11 External Adapter Kit	\$40.00(38.00)
Colorado Memory System KE-09 External Drive Kit	\$85.00(82.00)
Colorado Memory System FC-10 500Kb/s-1Mb/s Adapter Kit	\$90.00(87.00)
Colorado Memory System TC-15 Data Compression Adapter Kit	\$189.00(184.00)
Cyrix 8387-16 / IIT 3C87SX-16 Math Coprocessor	\$113.00 / \$110.00
Cyrix 8387-20 / IIT 3C87SX-20 Math Coprocessor	\$126.00 / \$125.00
Cyrix 8387-25 / IIT 3C87SX-25 Math Coprocessor	\$136.00 / \$128.00
Cyrix 8387-25 / IIT 3C87DX-25 Math Coprocessor	\$154.00 / \$146.00
Cyrix 8387-33 / IIT 3C87DX-33 Math Coprocessor	\$167.00 / \$156.00
Cyrix 8387-40 / IIT 3C87DX-40 Math Coprocessor	\$185.00 / \$188.00

Terms & Conditions: All parts and systems carry a One Year Limited Warranty except monitors and printer which warranty by manufacturers. All sales on Monitor, Printer and Hard Disk Drives are final. NO REFUND. All returns are subjected to our approval and must have prior authorization. Return items must be in its original condition, send shipping prepaid. All refunds or credits are less shipping and bank charges. All refunds items must be returned within 14 days of invoice. There will be a 20% restocking fee after the 7 days period and within 30 days of invoice. Thereafter, only exchanges are available during the rest of the warranty period. Price, Specification & Availability subject to change without any notice. All prices subject to change without notice.

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TECH SUPPORT ONLY (714) 546-7902 FAX (714) 546-3803



Continued from page 72

RESOURCES:

The Complete Communicator v2.62, \$499
The Complete PC, Inc.
1983 Concourse Dr.
San Jose, CA 95131
(408)434-9600

When you are traveling, you can do everything from a remote phone just as easily as from your office. Once you dial in and are recognized as the boss, you have complete control. Now you can listen to your messages, archive the ones you need to save, or forward some to others.

If you have a beeper, you can even set The Complete Communicator to beep you when you receive a new message. It will call your beeper number, send the numbers for you to call back, and then hang up all by itself. You

also have the option of having a call transferred, rather than just notifying a beeper.

Most of the functions offer a range of options, giving you flexibility to customize almost any element of the voice mail system. For example, you can set a maximum message length for messages from 30 to 999 seconds. However, even with all of the customization options, The Complete Communicator is easy to use and understand. I found that leaving everything on the defaults was a good way to begin using the program.

After using The Complete Communicator for awhile, it's easy to reset the functions to whatever works best for you.

OTHER TYPES OF COMMUNICATOR

I spend almost 100% of my time under Windows, and use the included FAXit for Windows, or WinFax Pro, as my fax printer. However, WinFax Pro does not work with The Complete Communicator. Also, I use The Complete Communicator fax software to print or view my faxes.

The modem on The Complete Communicator works the same as its counterpart on The Complete Fax 9600, also from The Complete PC. I used this modem with the usual array of telecommunication software, again with no difficulties.

I tested the scanner port on The Complete Communicator with The Complete PC Page Scanner. Although I had no problems, you must be careful when setting the defaults in the scanner software. The I/O address and Interrupt level for both the scanner and Complete Communicator must match exactly. If not, strange things may happen. When I inadvertently set the Interrupt for the scanner differently than for The Complete Communicator, everything appeared to work, but the scanned image appeared on the screen while the paper moved through the scanner. I switched back to DOS, tried the scanner again, and everything worked. There is a section in the Appendix devoted to problems, and it told me that I probably had set the interrupts differently, which was true. I reset the Interrupt level so they matched, and everything worked.

The Complete Communicator runs from a traditional menu-type of screen, with all menu items also controlled by function keys. The F1 key calls up a good, context sensitive help that explains each of the options available from the screen you are currently looking at. In fact, after setting the initial options, the online help is so good you will probably not need to check the printed documentation again.

For those who do read the documentation, it is complete, as well as easy to read and understand. I found answers to almost all of my questions in the documentation. And, for me, that's probably a first.

I find that the multitude of functions on a single board allow me to run my consulting business with a minimum of hassles. I haven't found any other fax board or voice mail system as easy to use as The Complete Communicator. And, since everything fits on a single board, I would not switch to multiple boards to accomplish these same things, ever. I guess you can say, like the old ad, I'd rather fight than switch. ■

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386-25 DX	\$1065
386-33 64k	\$1095
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486-33 256k	\$1450

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486-33 EISA	\$2550

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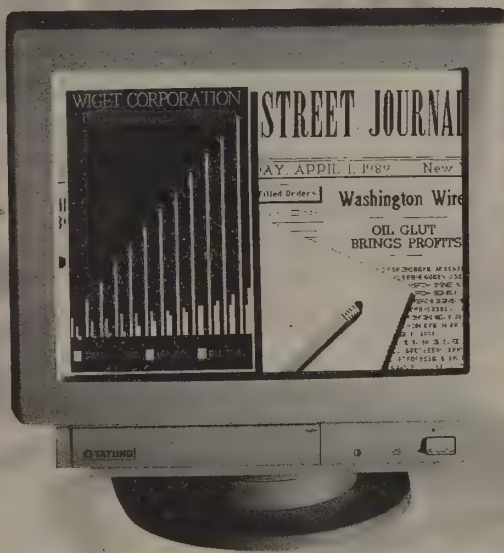
The **Tatung** name is practically synonymous with the word "monitor." That's because, as one of the five largest manufacturers, we have produced more monitors for more users than almost anyone, anywhere in the world.

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CM-1492V	14" 0.39mm VGA	31.5KHz	640x480
CM-1496V	14" 0.31mm VGA	31.5KHz	640x480
CM-14SAM	14" 0.39mm SVGA	31.5KHz/35K-38KHz	1024x768 (I.)
CM-14SAS	14" 0.28mm SVGA	31.5KHz/35K-38KHz	1024x768 (I.)
CM-14SAE	14" 0.28mm SVGA	31.5KHz/35K-38KHz	1024x768 (I.) VLMF+
CM-1400	14" 0.25mm SVGA	31.5KHz/35K-38KHz	1024x768 (I.) *
CM-14UAS	14" 0.28mm UVGA	31.5/35.5/37.5/48 KHz	1024x768 (N.I.)
CM-14UAE	14" 0.28mm UVGA	31.5/35.5/37.5/48 KHz	1024x768 (N.I.) VLMF+
CM-17MBD	17" 0.28mm Hi-Res	29K-66KHz	1280x1024 (N.I.)
CM-2000	20" 0.31mm Hi-Res	21K-65KHz	1280x1024 (N.I.)

+ : Meets MPR II Low Radiation Standards

* : Trinitron Tube

RESOURCES

Calendar Of Events

MAY

May 22 Intermediate Lotus Class. Monrovia. The Organizers. Call: (818)303-3311.

May 24 Computer Show & Sale. Antelope Valley Fairgrounds, Lancaster. MarketPro Shows. Call: (415)388-8893.

May 30 Computer Show. SDSU Aztec Center, San Diego. Computer Marketplace. Call: 1-800-800-5600.

May 30 Computer Show & Sale. Anaheim Stadium. Richard James Corp. Call: 1-800-433-7469.

May 31-June 6 Borland's Database Conference. Palm Desert. Borland. Call: 1-800-942-8872.

JUNE

June 1-3 Collaboration '92: Conference Exploring The Intersection Of Corporate Culture And Information Technology. San Francisco. Graphics Communications Assoc. Call: (703)519-8160. Email: mern@well.sf.ca.us.

June 1-5 Object Expo. New York. *Object Magazine*. Call: (212)274-9135.

June 2 Panel Discussion On Client/Server Technology. Los Angeles. Microcomputer Managers Association, L.A. chapter. Call: (213)243-6843.

JUNE 2-3

LAP & PALMTOP '92 Los Angeles Airport Hilton

After five successive years in New York, this portable computing and communication conference and exhibition has come to Los Angeles. You will be able to preview leading edge portable products before they hit the market and attend relevant conferences presented by industry leaders. Conference topics include: The Real Story Behind Pen and Tablet Systems, Hidden Opportunities for Users of Portable Applications; Maximizing Your Portable Investment via Upgrades; and Handhelds, Palmtops, and Notebooks—One Size Doesn't Fit All. For registration, call: 1-800-444-3976.

June 2-3 Lap & Palmtop '92: Portable Computing And Communication Conference & Exhibition. Los Angeles. Laptop Expositions. Call: (212)682-7968.

June 6 Computer Show. L.A. Fairgrounds, Pomona. Computer Marketplace. Call: 1-800-800-5600.

June 6 DOS Class. Monrovia. The Organizers. Call: (818)303-3311.

June 7 Computer Show. Sequoia Conference Center, Buena Park. Computer Marketplace. Call: 1-800-800-5600.

June 7 Computer Show & Sale. Glendale Civic Auditorium. Richard James Corp. Call: 1-800-433-7469.

June 7 Computer Show & Sale. Civic Auditorium, Oxnard. MarketPro Shows. Call: (415)388-8893.

June 8-10 Securing Your Networks Conference. San Antonio, TX. CSI. Call: (415)905-2626.

June 8-10 SeniorFest '92: SeniorNet Fourth International Conference. Washington, D.C. SeniorNet. Call: (415)750-5030

June 8-12 USENIX Summer 1992 Technical Conference. San Antonio. USENIX Assoc. Call: (714)588-8649.

June 9-12 Hands-on PC Configuration & Troubleshooting Course. Los Angeles. Learning Group International. Call: Kim Sisson, 1-800-421-8166.

June 10-11 The Outsourcing Conference: Guidelines, Methodologies, And Issues. San Francisco. DCI. Call: (508)470-3880.

June 13 Computer Show & Sale. CSU, Northridge. Richard James Corp. Call: 1-800-433-7469.

June 13 Windows 3.1 Class. Monrovia. The Organizers. Call: (818)303-3311.

June 16-19 Hands-on Novell Networking Course. Los Angeles. Learning Group International. Call: Kim Sisson, 1-800-421-8166.

June 16-19 Network Planning, Support & Management Course. San Diego. Learning Group International. Call: Kim Sisson, 1-800-421-8166.

JUNE 6

COMPUTER SHOW Pomona

Computer Marketplace computer shows feature hundreds of exhibits with thousands of products. Admission is \$6.00 and shows are from 10:00 am to 5:00 pm. Los Angeles County Fairgrounds (Fairplex), Pomona. Call: 1-800-252-7927.

June 18-20 Science, Mathematics, And Macintosh Conference. Santa Barbara. UCSB Extension. Call: (805)893-4143. Email: XU02JFE@ucsbuxa.ucsb.edu.

June 18-20 Tutorial Week '92: Series Of Seven Tutorials. Los Angeles. ACM. Call: Dave Oppenheim, (310)397-2546.

June 19-21 Summer Shareware Seminar. Indianapolis, IN. Public Brand Software. Call: 1-800-856-4144.

June 20 Intro To The IBM PC Class. Monrovia. The Organizers. Call: (818)303-3311.

June 21 Computer Show & Sale. Scottish Rite Center, San Diego. MarketPro Shows. Call: (415)388-8893.

June 23 Computer Show. Sherman Sq. Entertainment Center, Reseda. Computer Marketplace. Call: 1-800-800-5600.

June 23-25 Seybold Digital World Conference And DemoCenter. Beverly Hilton Hotel, Beverly Hills. Seybold Seminars. Call: 1-800-777-6650.

June 23-25 Tenth Annual PC Expo. New York. Bruno Blenheim, Inc. Call: 1-800-829-3976.

June 24 Beginning WordPerfect Class. Monrovia. The Organizers. Call: (818)303-3311.

June 26 DOS Class. Monrovia. The Organizers. Call: (818)303-3311.

June 27 Computer Show. L.A. Fairgrounds, Continued

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June 6, 1992 SATURDAY

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June 7, 1992 SUNDAY

Sequoia Conference Center, Buena Park

June 27, 1992 SATURDAY

L.A. Fairgrounds (Fairplex), Pomona

June 28, 1992 SUNDAY

Sherman Square Entertainment Center, Reseda

July 18, 1992 SATURDAY

L.A. Fairgrounds (Fairplex), Pomona

July 19, 1992 SUNDAY

Sherman Square Entertainment Center, Reseda

August 8, 1992 SATURDAY

L.A. Fairgrounds (Fairplex), Pomona

August 9, 1992 SUNDAY

Sherman Square Entertainment Center, Reseda

August 29, 1992 SATURDAY

L.A. Fairgrounds (Fairplex), Pomona

August 30, 1992 SUNDAY

Sequoia Conference Center, Buena Park

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October 10 & 11, 1992 SATURDAY & SUNDAY

L.A. Fairgrounds (Fairplex), Pomona

November 7, 1992 SATURDAY

L.A. Fairgrounds (Fairplex), Pomona

ALL SAN DIEGO SHOWS HAVE BEEN CANCELLED

Calendar Of Events continued

Pomona. Computer Marketplace. Call: 1-800-800-5600.

June 28 Computer Show & Sale. Burbank Hilton Convention Center. Richard James Corp. Call: 1-800-433-7469.

June 28 Computer Show & Sale. Pasadena Center. MarketPro Shows. Call: (415)388-8893.

June 29-July 1 Database World Conference & Expo. Boston. DCI. Call: (508)470-3880.

JULY

July 6-10 International Conference On APL. St. Petersburg, Soviet Union. ACM, FinnAPL, & SIGAPL. Call: Lynne C. Shaw, (212)836-8644. Email: LynneShaw@mts.cc.wayne.edu.

July 7-10 Informix Worldwide Users Conference. San Jose. Informix. Call: 1-800-247-0262.

July 10 Beginning Lotus Class. Monrovia. The Organizers. Call: (818)303-3311.

July 11 Beginning WordPerfect Class. Monrovia. The Organizers. Call: (818)303-

3311.

July 11 Computer Show & Sale. Anaheim Stadium. Richard James Corp. Call: 1-800-433-7469.

July 11 DOS Class. Monrovia. The Organizers. Call: (818)303-3311.

July 12 Computer Show & Sale. Glendale Civic Auditorium. Richard James Corp. Call: 1-800-433-7469.

July 12-17 Tenth National Conference On Artificial Intelligence. San Jose. AAAI. Call: (415)328-3123. Email: ncai@aaai.org.

July 13-14 Database/Word Processing Software Workshop. Los Angeles. Symantec Training Group. Call: 1-800-786-8620.

July 14-17 Hands-on PC Configuration & Troubleshooting Course. Los Angeles. Learning Group International. Call: Kim Sisson, 1-800-421-8166.

July 15-17 Project Management Software Workshop. Los Angeles. Symantec Training Group. Call: 1-800-786-8620.

July 18 Computer Show. L.A. Fairgrounds, Pomona. Computer Marketplace. Call: 1-800-800-5600.

July 18 Intro To The IBM PC Class. Monrovia. The Organizers. Call: (818)303-3311.

July 19 Computer Show. Sherman Sq. Entertainment Center, Reseda. Computer Marketplace. Call: 1-800-800-5600.

July 20-22 Sun Expo. Anaheim. Publication and Communications, Inc. Call: 1-800-727-EXPO.

July 21-24 Hands-on UNIX In C Course. Los Angeles. Learning Group International. Call: Kim Sisson, 1-800-421-8166.

July 25 Computer Show & Sale. CSU, Northridge. Richard James Corp. Call: 1-800-433-7469.

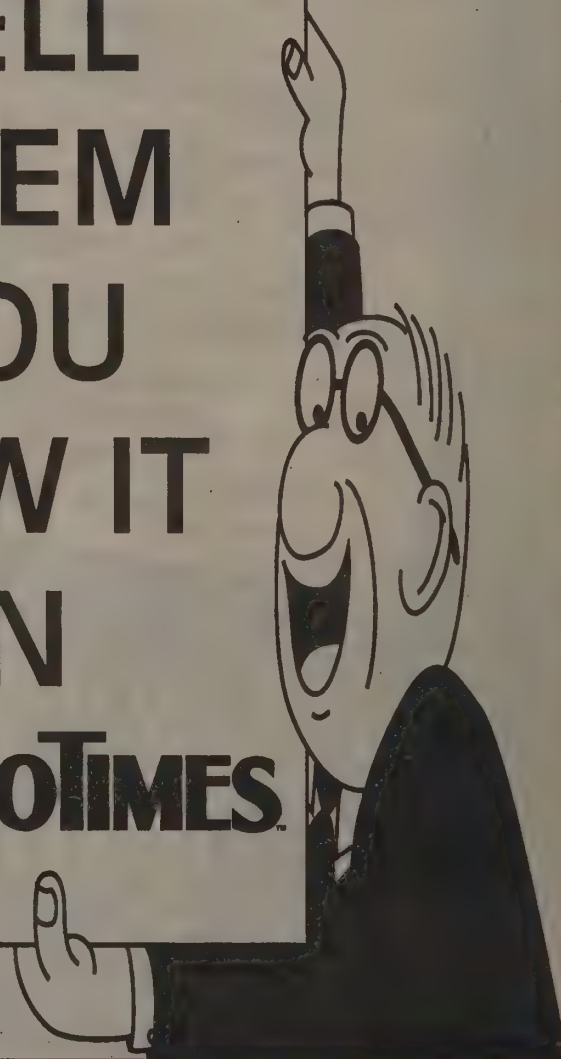
July 26-31 SIGGRAPH '92. Chicago. ACM. Call: (312)321-6830. Email: info92@siggraph.org.

July 28-31 Effective Skills For Technical Managers Course. San Diego. Learning Group

Continued on page 154

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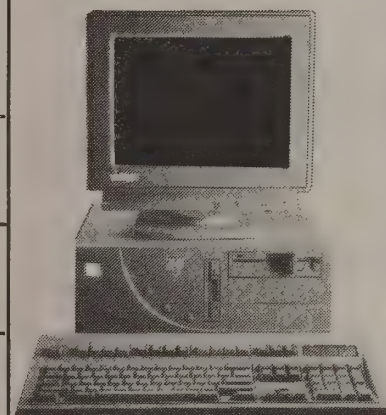
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Dynamic 486-33 w/256K Cache EISA	\$1915	\$1995	\$2039	\$2315
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Dynamic 486-33 w/64K Cache	1264	1354	1388	1664
Dynamic 386-33 w/64K Cache	1040	1130	1164	1440
Dynamic 386SX-25 w/32K Cache	902	990	1026	1299
Dynamic 386SX-16	867	959	991	1279



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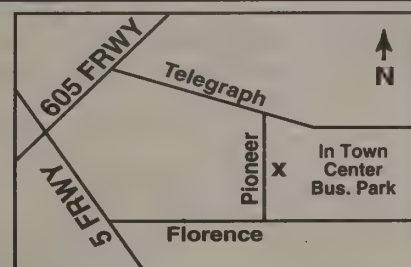
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CONTROLLER 1:1
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MONITOR 14" (1024x768) .28 DOT
- 2 SERIAL, 1P, 1G PORT
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w/DIGITAL DISPLAY,
250 WATT POWER SUPPLY
(UL APPROVED)
- FOCUS 6000 PLUS KEYBOARD
- HI RES. MOUSE

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619

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BBSing In The Southland

By Mike Markowitz

We spotlight a different local bulletin board each month. If you'd like to suggest a particular board for this monthly profile, send information to BBS Spotlight, MicroTimes, 3470 Buskirk Ave., Pleasant Hill, CA 94523, fax (510)934-3958. Send electronic mail directly to Mike Markowitz at mmarkowi@pepvax.pepperdine.edu on the Internet, or MOUSKOWITZ on America Online.

The Hotline BBS—Looking For Mr. Goodbye

"Online chat has become the CB radio of the '90s," says John Coon, the founder of Hotline BBS, a twenty-four-hour adult social BBS based in Orange County. Hotline started in December 1988 with nine lines, and has grown to sixteen. The current software, a package called Wildcat, has the capability to handle thirty-two simultaneous chat users.

Like most sysops, John got into running a BBS as a hobby. In real life, he was trained as an accountant, and works as an analyst for a utility company. The board "meets its expenses, but we won't retire on the profits," he jokes.

Hotline has about six hundred current users, mostly singles, with an average age of thirtysomething. There is a wide range of occupations—professional, clerical, and blue-collar.

Kathy Miramontes is the social director of Hotline, organizing a series of beach parties, pizza parties, and Happy Hours at local watering spots, so that members can meet face to face. She emphasizes that Hotline is "not a sex-type board," just a "real nice group of people." Although she doesn't see her role as that of a matchmaker, she confirms that a number of married or engaged couples have met their mates through Hotline.

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805

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818

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Black Data Processing Association, Los Angeles Chapter. Meetings: 4th Tues., 6:30 pm, ULTC, 7226 S. Figueroa St., Los Angeles. Call: (310)673-6522 or 1-800-727-BDPA. [Exp. #97.]

Data Processing Management Association. Meetings: 2nd Thurs., 7:00 pm. An organization composed of all levels of management personnel who have an interest in the field of information processing. Call: (310)549-9680 or (213)225-9210. [Exp. #101.]

Independent Computer Consultants Association, Los Angeles Chapter. Meetings: 1st Thurs., 6:00 pm. Prepaid reservation, \$25, or at the door, \$35. The LA chapter provides referral services. Call: (213)872-1811. [Exp. #101.]

Microcomputer Managers Association, Los Angeles Chapter. A forum for the discussion of issues relating to implementing and supporting microcomputer technology. Call: (213)243-6843. [Exp. #100.]

Orange County Association Of PICK Professionals. Meetings: 3rd Wed., 6:00 pm, Claim Jumper Restaurant, 18350 Brookhurst St., Fountain Valley. Dinner: Members, \$20; nonmembers, \$25. Without reservations add \$5 additional. Call: (714)641-6347. [Exp. #101.]

The Software Council Of Southern California (SCSC). Meetings: Last Wed., 6:00 pm, Long Beach Airport Marriott, 4700 Airport Plaza Dr., Long Beach. SCSC was founded to further the interests of software development organizations, as well as companies that provide support and services to the local software industry. Call: (310)328-0043. [Exp. #98.]

USER GROUPS

ACCOUNTING

L.A. County Cougar Mountain Accounting Software User Group. Call: (818)788-2627. [Exp. #101.]

AMIGA

LAAUG—Los Angeles Amiga User Group. Meetings: 3rd Wed., 7:30 pm, Veteran's Memorial Auditorium, Overland Ave. & Culver Blvd. Many SIGs, rookies, monthly PD disks. Call: Kip Hammond, (310)390-3010. [Exp. #99.]

SBAD—South Bay Amiga Dudes/Dudettes. Meetings: 1st Thurs., 7:00 pm, South Bay Contemporary Museum of Art, Torrance. Call: Gordon Barbay, (310)376-7329. [Exp. #101.]

APPLE

Orange Apple Computer Club. Meetings: 1st Sat., 9:00 am, Orange Coast College, Chemistry Lab. Apple II supported. Call: (714)731-9243. [Exp. #99.]

Original Apple Corps, Apple II User Group. Meetings: 2nd Sun. Support for beginners through experts. Write: PO Box 90065, Los Angeles, CA 90009. Call: Fred Duffy, (310)475-8400. BBS: (310)454-4660. [Exp. #99.]

Valley Apple Computer Club. Meetings: 3rd Tues., 7:30 pm, Cleveland High School, 8140 Van Alden, Reseda. Apple II, II+, IIc, IIe, and IIGs. No Macs. Call: Bill, (818)988-1852. [Exp. #100.]

ATARI

ATESIG—Atari 8-bit SIG. Meetings: 145 Surf Pl., Seal Beach. Cooperative user group for Model Railroad applications. Call: (310)430-5433. [Exp. #100.]

RAM Atari ST User Group Of Ventura County. Meetings: 3rd Wed., 7:30 pm, Call: Tim McCoy, (805)389-0059. [Exp. #97.]

South Bay Atari Computer Enthusiasts. Meetings: 2nd Tues., 7:30 pm, Lomita VFW Hall, 1865 W. Lomita Blvd. Active since 1985, novices & all skills welcome. Call: (310)375-4839. [Exp. #97.]

CAD/CAM

Los Angeles Area AutoCAD User Group. Meetings: 4th Wed., 6:30 pm, Burbank Board of Realtor's Bldg., 2006 W. Magnolia Blvd., Burbank. Meetings feature tutorials, Q&As, demos, hands-on, BBS, and newsletter. Call: M. Berman, (818)762-9966. [Exp. #96.]

COMMODORE

C128 West Commodore 128 User Group. Meetings: Covina & Santa Monica. Free membership. Large disk library. Call: John, (818)331-1589; Paul, (818)892-3859; BBS (714)598-1755 FidoNet. [Exp. #96.]

Commodore Helpers Of Long Beach. Meetings: 2nd Sat., 9:00 am, St. Timothy's Lutheran Church, Woodruff and Arbor in Lakewood. Supports 64/128 models. Call: Tom Hoy, (310)424-0508. [Exp. #99.]

Orange County Commodore Club. Meetings: 4th Sat., 11 am, Fidelity Federal Bank,

19900 Beach Blvd., (Newland Shpg Ctr) Huntington Beach. Call: Mike Moore, (714)668-9715. [Exp. #96.]

South Bay Commodore Users Group. Meetings: 3rd Thurs., 7:00 pm, SEC Redondo Generating Station, 1100 Harbor Dr. (across from King Yacht Harbor). Free and open to all who use or own Commodore computers and to those who would like to receive or exchange information on programs, applications, or hardware. Call: (310)324-8357. [Exp. #100.]

DESKTOP PUBLISHING

Southern California Ventura Publisher User Group (SCVPUG). Meetings: Last Tues., 7:00 pm, 401 N. Brand, Glendale, Glendale Federal Bank Building. Product demos, Q&As, library resources. Call: (818)955-5830. [Exp. #101.]

VICUG—DTP (Valley IBM/Compatibles User Group—Desktop Publishing). Meetings: 1st Fri., 7:00 pm, Union Federal Savings Bank, 13330 Ventura Blvd., Sherman Oaks. Membership fee \$25/yr or \$3 at the door. Call: Harry Tischler, (818)997-1470. [Exp. #99.]

EPSON

SFV & LA Epson QX User Group. Meetings: 3rd Mon., 7:30 pm, The Meeting Place, Fallbrook Mall, Canoga Park. Call: Bill Winter, (818)347-7417. [Exp. #96.]

IBM & COMPATIBLES

Greater South Bay PC User Group. Meetings: 2nd Thurs., 7:30 pm, Christ King Lutheran, 2706 W. 182nd St., Torrance. Visitors welcome. Call: (310)542-4996. [Exp. #96.]

Long Beach IBM PC And Compatibles User Group. Meetings: 3rd Wed., 7:00 pm, Los Altos Methodist Church, 5950 E. Willow St., at Woodruff. Novices and experienced welcome. BBS, PD library, newsletter, and SIGs. Call: Jim Wells, (310)439-7114. [Exp. #97.]

Los Angeles Computer Society. Meetings: 2nd Tues., 7:00 pm, Culver City High School Cafeteria. Meetings are free and there are always live presentations and giveaways. Call: (310)473-6668. [Exp. #101.]

Orange Coast IBM PC User Group. Meetings: Last Sat., 9:00 am, Orange Coast College. Speakers, BBS, software library, newsletter, and SIGs. Everyone welcome. Call: (714)843-2048. [Exp. #99.]

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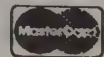
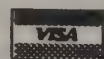
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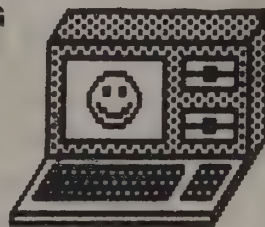


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BBS, library, and newsletter.
Call: Steve Bass, (818)795-
2300. [Exp. #96.]

**Thousand Oaks Personal
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Meetings: 4th Thurs., 6:30 pm,
Goebel Senior Adult Center,
1385 E. Janss Rd., Thousand
Oaks. Call: (805)496-9699.
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Valley Computer Club.
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Ventura PC User Group.
Meetings: 3rd Sat., 9:00 am,
Poinsettia Pavilion, Canada
Larga Rm., 3451 Foothill Rd.,
Ventura. Guests welcome, no
charge for attendance. Call:
Kenn Ritza, (805)644-6955.
[Exp. #99.]

**VICUG (Valley IBM/
Compatibles User Group).**
Meetings: 4th Fri., 7:00 pm,

Security Pacific Bank, 14801
Ventura Blvd., Sherman Oaks.
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at the door. Call: Harry
Tischler, (818)997-1470.
[Exp. #99.]

KAYPRO

**West Los Angeles Kaypro
User Group/KAYOS Kaypro
User Group.** Meetings: 4th
Mon. of even months, 6:30
pm, El Segundo. Call: Margot,
(310)379-8339. [Exp. #96.]

K-MAN

Southern California

KnowledgeMan User Group.
Meetings: 1st Wed., 7:00 pm,
Honda North America, Bldg.
300, 700 Van Ness Ave.,
Torrance. Call: (213)662-
9910. [Exp. #100.]

MACINTOSH

**The American Film Institute
Mac User Group (AFIMUG).**
Meetings: 2nd Mon., Apple
Lab, AFI, Hollywood. TV, film,
and video. Call: Dave
Chadderdon, (213)856-7743.
[Exp. #97.]

**Los Angeles Macintosh
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**San Gabriel Valley Mac Users
Group.** Meetings: 1st Thurs.,
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**West Orange County
Macintosh User Group
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NeXT

**Southern California
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THEOS

THEOS User Group. Call: Fred
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[Exp. #97.]

UNIX

**UNIX User Association Of
Southern California.**
Meetings: 2nd Mon., 7:00 pm,
New Horizons Learnings
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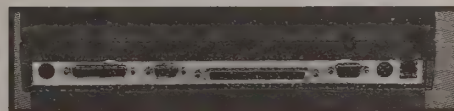
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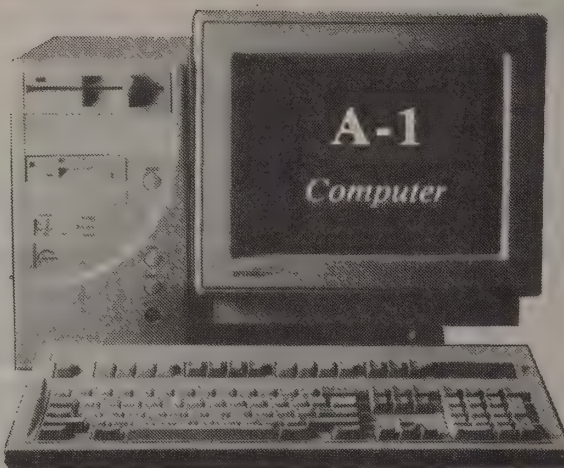
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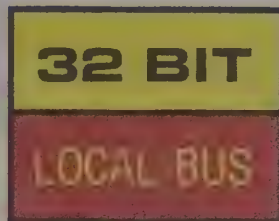
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Continued from page 68

you develop from people that come into the company and wish to be trained? And that's not just programmers, by any sense. It's people throughout the organization.

You need talent everywhere in the company—it's that broadly based talent, of being engaged in the industry. In the software business, you're not investing heavily—we didn't even own a forklift for the first five or six years. There's no capital equipment. Even the PCs don't cost much—they cost like a guy's salary for a month.

You're investing in people. And if you don't invest in developing the people you have, in getting the right people, you're going to fail. It's just that simple.

This isn't Marin County airhead mush, it's just good business. If your asset is people, and you don't invest in the asset, you're crazy. It's like you're running a railroad and you don't invest in the rails—after a while, the trains start running off. It's just stupid.

So I think you simply have to do that. And if you make that investment, then the company can grow over a period of time and continue to succeed.

I think a lot of the problem that you have in business, and also in politics and so forth which I'm *totally* not interested in, is that it's always easy to neglect maintenance right now. The impact is always deferred well past the current horizon, or perhaps even somebody's retirement date.

If the railroad starts to get in trouble, "Well, let's just stop fixing the tracks." And you know, for the first three years nothing really bad happens. And then, unfortunately, that guy retires and a new guy comes in, and the trains start running off the rails, and "Oh gee, it's going to cost \$4.5 billion to replace all the tracks on the railroad, and we don't have that much money." And then you're stuck.

Similarly, if you take a typical software company, you can fire all the programmers, and probably for twenty-four months nothing goes wrong. You make all kinds of money. And then all your competitors come out with new releases and you say, "Oops! Guess we should

have had a new release..." And then you're stuck.

It's just sound business, in a business that is talent-constrained, to do everything you can to attract and retain the talent that you have. Because that's really all you have.

Given that you can find them, what tends to keep talented people interested and involved?

I think one thing that people don't pick up when they talk about Autodesk—because Autodesk kind of had this image, at least, of being a very far-out-on-the-leading-edge kind of company, in some ways—is that of all the guys who founded Autodesk, we were all maintenance programmers. We weren't Xerox PARC researcher-type guys. We were guys that worked on these big operating systems that live for twenty-five or thirty years, out in the field, fixing bugs.

We were *maintenance* programmers. And the culture of the maintenance programmer is very different than the culture of the research guy. The maintenance programmer works directly with the customer. Maintenance programmers recognize that someday they're going to retire and their children will be maintenance programmers, who are going to have to inherit this thing.

But really, it's more of an ethos that is that of engineering rather than that of a writer or of a moviemaker or something. It's recognizing that the thing has a life cycle, that there are lots of people involved in it, that if you write something and don't adequately document it so somebody can pick it up, you're not doing your job. You're fundamentally not doing your job.

And we try to take that approach to everything we do. We certainly rely on individual talented people, and one of the things that's unique about this business is that there are individuals who are hundreds of times more productive than other people who are productively employed in this business. When you find those superstars, great. But you can't build a company out of all superheroes, because there aren't enough superheroes to go around.



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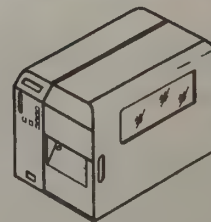
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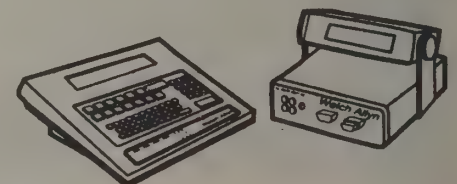
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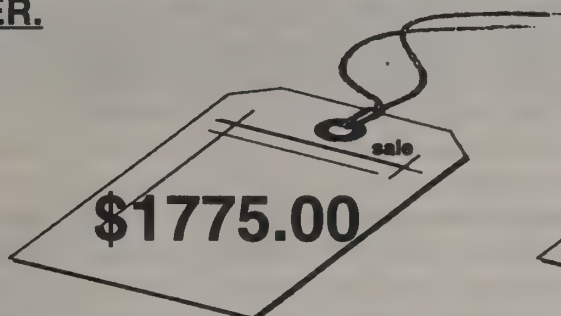
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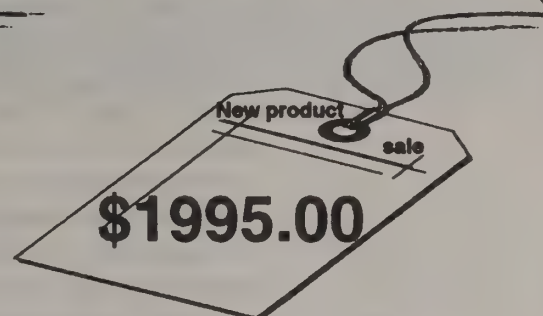
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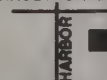


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And besides, they don't necessarily get along when you get them.

[laughs] That's right.

If you're fulfilling the needs of real customers, you have to be able to do it with a product cycle that fits the customer's expectations. You have to meet the needs of the marketplace, you have to evolve onto the new hardware that's coming along. And that means, in a large developed market like the market for AutoCAD or for spreadsheets or for word processors, you have large teams of people doing lots of things at once, doing lots of things in parallel. And that's management. You need to have management that understands how to run big engineering projects.

It's not the most exciting thing in the world to talk about, but if you want to be in this business you've got to know how to do it. You can't design and manufacture cars with one bright guy that knows a lot about cars. It takes a lot of people in that cycle, all the way through. And that's the way we have to build software.

It's a perspective you have to have. Particularly as the user expectations grow. When you go into Egghead, and pay \$35 for a piece of software, you expect to have something that's got a large number of man-years of work in it. I may say your expectations are ridiculous, [laughs] but they're yours, and you've got the money, so I better conform.

I think part of what's happened is that the kinds of things we vendors had the audacity of selling for money four and five years ago are what you expect out of a public domain program now. So if we intend to go on asking people to pay money for this stuff, we're going to have to really give them something that's worth it.

And that's a big job. When you talk about the big CAD systems, the mainframe CAD systems, those are systems that are fifty times bigger than AutoCAD. We have a long way to go just in that line, and our users can use every bit of that capability just as soon as we can get it to them.

But those are big engineering projects that have to be done in a rigorously professional manner, or you're going to fail. If you talk about building a system that has conceptual design on the front end, drafting in the middle, manufacturing on the back end, it integrates to your manufacturing control system, it complies with the ISO 9000 specs for quality control that are being enforced around the world now, that communicates to other CAD systems in the PDES product description language that is now becoming standardized—you end up with a couple hundred people working on these things, and all the pieces, and they've got to plug together when you put it in a customer location.

How do you avoid the design-by-committee problem when you do that?

Well, at some level I'm not convinced there's a problem with that. You certainly look for inspiration, but also you have to get there from here. In the engineering world, many things are designed by committees whether you like it or not. The IGES standard—you can't sell a CAD system unless you can read and write IGES—was designed by a committee. You may be on the committee, but all your competitors are on the committee, and government and industry. People are on the committee, and they hand you this thing and then you go and implement it. We don't operate in a domain that affords us unlimited freedom. ASCII was designed by a committee. Unicode was designed by a committee. These are standards that you have to conform to.

When you go to build your own application, I think you avoid that by having those Wild Talents, and by doing a lot of prototyping, getting a feel for how something is really going to look, and then go out to the customers. Companies that aren't out there with the customers are doomed, I think. The customers have a lot more wisdom—when you've got half a million customers, there's a lot more cubic centimeters of neurons firing outside the organization than inside

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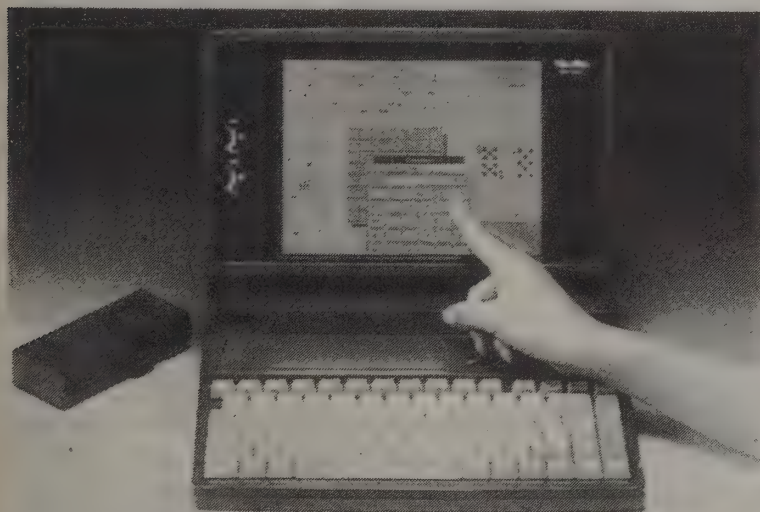
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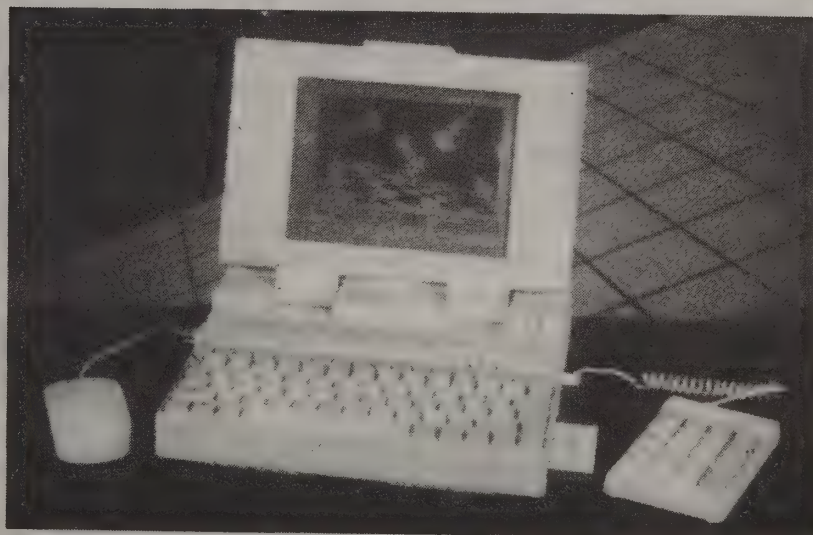
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the organization. And it's up to you to really be out there communicating with the customers, looking at what they're doing and learning from them.

Some people would have it that being engineering-driven and being customer-driven are diametrically opposed.

I think that's nonsense. I think that any business that isn't interested in meeting the needs of people in the real world is somebody's personal playpen and not a business. When I say meeting the needs, I mean meeting the needs of the people that are currently buying your products and the people that aren't buying them yet, or aren't buying the stuff that you aren't building yet.

You've got to be customer-oriented. I think every business is a service business. I believe that firmly, that fundamentally when you ask somebody to give you money, you have to be giving that person something that is more valuable to them than money.

That's what you're doing. And in the software business, it's even more of a service business, because when you're buying a piece of software, you're not buying something that's disposable. You're buying, generally, a commitment to something that you expect to be updated and upgraded, that you expect to preserve the investment you make in hammering parts of your life into this thing.

It seems that a lot of things you're talking about—long-term strategy, diversification, keeping your edge—pretty much flies in the face of the way business is done in the United States.

That's why I don't do business in the United States any more. [laughs]

So do you think there's hope for business in the United States?

I am uninterested and uneducated in the issues of politics.

I was less interested in politics than in what I've heard coming from the mouths of Mitch Kapor and John Roach and others, that the obsession with the quarterly bottom line is killing American business. Do you find that to be true, or not?

I guess that has killed a lot of companies. But I think it's been, perhaps, used as an excuse by other companies for killing themselves in other ways.

Meeting quarterly figures is an expectation of the United States public stock markets. But the responsibility for the long-term destiny of the company does not rest with the Wall Street investors, it rests with the senior management of the company. If the company has an asset value of a billion dollars, say, like Autodesk used to, and its management squanders that by focusing on the next ninety days, they are not doing their job.

There's a point at which you have to go to Wall Street, and say, "We're going to disappoint you. Because if we don't invest in this business, we are not doing our job as management. We're abdicating our fiduciary duty to the shareholders, to invest in the long-term future of this company."

You have to manage the business. You have to sometimes make Wall Street happy, and sometimes you have to make them unhappy. You have to make your decision, and sometimes, if you're a public company, that means you have to go out and take a lot of heat. But it's better to take the heat up front than it is to take the heat down the road, as surely it is coming if you don't make the investments that are necessary.

On balance, certainly I wish we'd never gone public, looking back on it. It would have given us a lot of freedom, and we didn't fundamentally need to go public. When we made the decision in '85, it was the right decision, because in 1985 we had a company that could run just like a couple of weeks if our sales went to zero. And we expected, within a year, to be competing with IBM, AT&T, ComputerVision, and Intergraph all at the same time. And doing that with no money is kind of a sobering prospect.

So from that context, we really had to do it. The fact that in retrospect we never really needed to is not something that you can undo at this point in time.

I think you do have to ask the question: "Is the environment that you're in the environment that is most conducive to long-term success?" And for Autodesk, we're not really coupled to the US, because substantially more of our sales come from outside the US than come from the US, and I expect that to continue. The US is less than a third of the global economy, and you should not be doing a huge percentage of your sales in the US. And we don't.

We do more business in Europe than the US. Particularly since our CAD business is very closely tied to the manufacturing business, you expect a large part of your revenue to come from those portions of the world where manufacturing is basically done, and that's not the US right now. Certainly Europe or the Far East are the meccas of manufacturing, and I don't see that trend reversing in the near future. So being strong there is very, very important to us.

But I think you also have to constantly reevaluate where you're going to make your investments, where you're going to do things. Up until last year, we did all of our software development in the United States. Now we have a software center in Neuchatel, where I work, and we're moving a substantial amount of our new software development and localization there. I expect before too many years pass we may also have a software development center in the Far East.

The Far East tends to be much more of a very-large-company, very-large-account market, whereas in both Europe and the US we have been selling in a very bottom-up fashion to individuals and small customers. Not that there aren't a tremendous number of individual customers in those markets—it really isn't five big companies running the whole thing. But being in those big companies is much more important, because they tend to set the standards for the people that subcontract for them, and the rest of the economy.

I think—I get nasty after two hours—I think a lot of companies fail because they're arrogant, ignorant American companies that think they can do business in somebody else's culture the way they do business in California. If you go in, and you're trying to sell somebody a word processor, and it doesn't use their character set, you're probably not going to get very far.

Hey, we're just a CAD system vendor, but we got a bunch of guys to sit down and draw eighty thousand characters. If you want to play in Taiwan, particularly, you've got to have traditional Chinese. You've got to have your commands, and the vector fonts that draw on the screen for CAD, and it's a big job. Think about what happens when all those little 256-character tables now have eighty thousand characters in them, and there's a whole disk full of just fonts, right? It's a real mess, but if you want to play the game, you've got to be in it. You can't sell cars with the steering wheels on the wrong side, you know? [laughs]

You have to make that investment. Typically the way we organize is that there's a country manager for each country, and that country manager is running the business in that country. They decide which of our products they will sell, what price, what distribution channel, how we do our support—they're the president of a company. Autodesk happens to have a headquarters in Sausalito, but Autodesk is an Italian company, and a French company, and a Russian company, and a Swiss company, because the people in those countries run the Autodesk business there, and they basically make the decisions.

They have to do that. I mean, the thought that you could sit in Sausalito and decide what the price and distribution strategy for Thailand is going to be—it's just crazy. Even if you could do it, it would be ten times harder than having somebody there who speaks the language, who knows the dealers, who visits the customers, who knows who the competition is.

Again, you just have to be sensitive to what people want. The European manufacturer does business in a very different way than a lot of American manufacturers do. And if you want to sell to them, you simply have to solve their problems. ■

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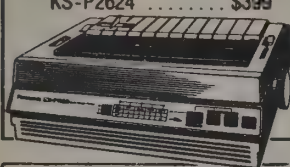
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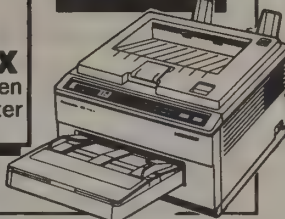
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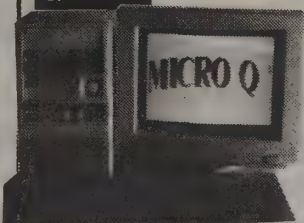
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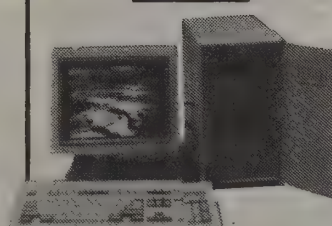
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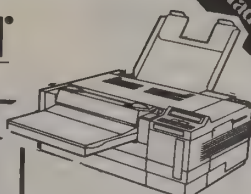
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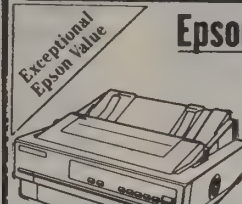
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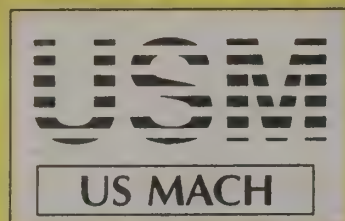
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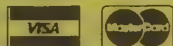
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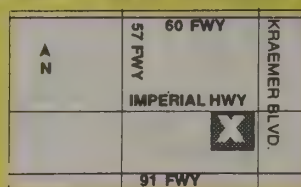


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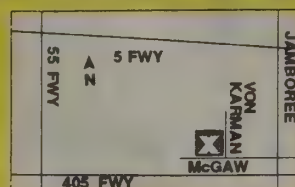
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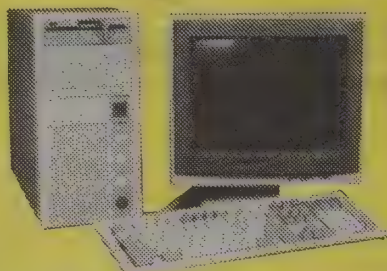
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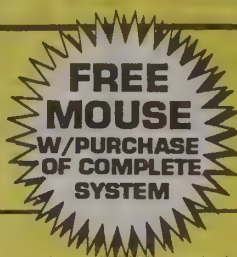


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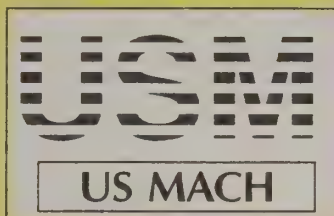
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NEWS & VIEWS

Continued from page 30

And so I too diversified. I bought a computer that was not an Amiga. I've still got my 3000, but it gets less and less use over time. I'm still waiting for Commodore to set a standard for 24-bit display cards. I would not consider buying one unless I felt confident that most of the future software would run on it. I'm still waiting for Commodore to figure out how to advertise the Amiga; perhaps if they do, the installed base will expand sufficiently to encourage more broad-based software development. I'm still waiting for decent, affordable, and reliable networking software for the Amiga, so that it has a chance in the business community. In short, I'm still waiting for the Amiga to be a success.

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THANKS AND ANTI-THANKS

I lay the blame for the Amiga's lack of success directly at Commodore's door. Perhaps revolving door would be a more apt description. Since I've been covering the Amiga, the long list of presidents, vice presidents, public relations firms, advertising firms, and assorted marketing flacks that have passed through Commodore is impressive and depressing. The market positioning for the Amiga product line has changed more often than a one-year-old's diaper. The pricing on

Amigas has changed more than the hemlines on skirts, and in as many directions. Commodore, get a grip.

There are a lot of people I've got to thank for helping me with my writing career. Roger Tierce and Malcolm Lowe and the rest of the gang from the San Francisco Commodore User's Group for taking me under their collective wing when I was just starting, and for that great run we made at promoting Commodore computers, the West Coast Commodore Association—the first West Coast Commodore-specific trade show promoters. Guy Wright for letting me write for *AmigaWorld*, and Bob Kinney for putting me on staff for a year at *Commodore Magazine*, may it rest in peace. Mary Eisenhart, my editor here, for letting a brash, young know-it-all talk her into a regular column for Commodore computers, and for giving me virtual carte blanche as to content. All the guys that put the First Amiga User's Group together, and brought the spirit and excitement of those early years to so many. The engineers at Commodore who still haven't given up. The developers who created some of the most innovative hardware and software (here's hoping you all get the success you so richly deserve).

The Amiga has made an impact in the video market. A great portion of that success is due

The list is long and painful. The number of Amiga developers who could be counted as true successes is small, and most of them diversified with development on other platforms.

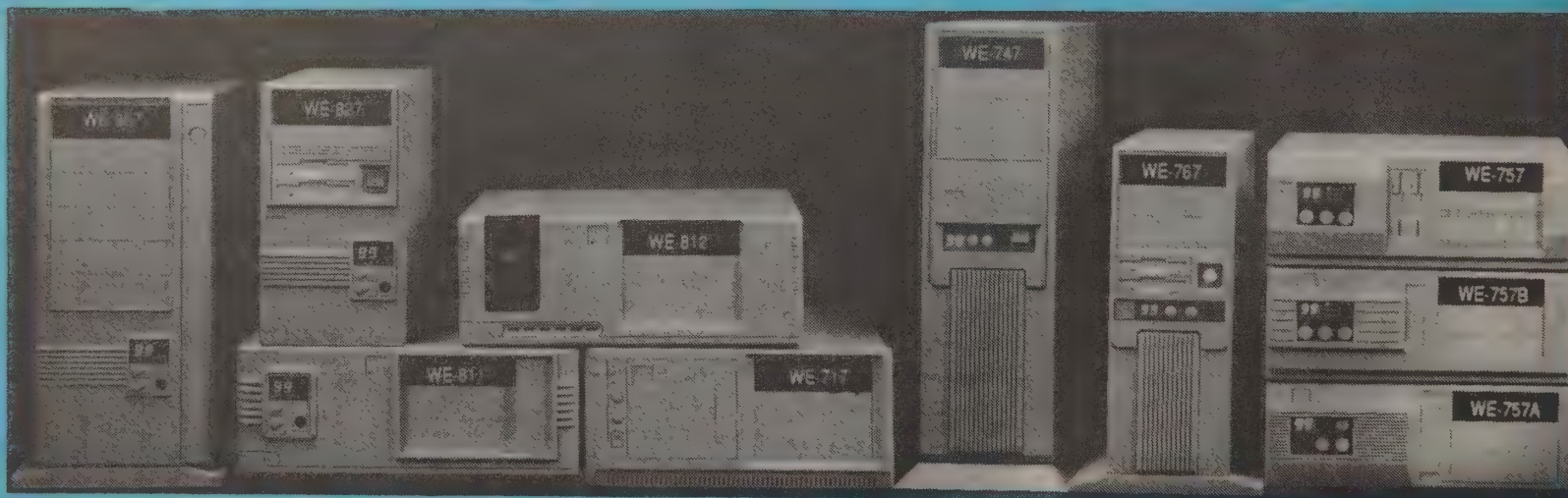
to one company, NewTek. For those of you interested in things Toasted, I recommend the *Video Toaster User* magazine, published by Avid Publications. They cover more than just Toaster-related products and do a great job on video and animation as well. I also recommend the *AmigaWorld Special Issue on Video & Animation*. While *AmigaWorld* often misses the mark, this issue is right on the money.

Finally I'd like to thank you for being a great audience for this column over the years. I hope that you've gotten as much enjoyment out of it as I have. ■

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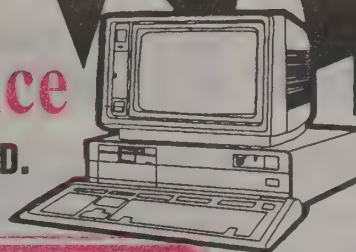
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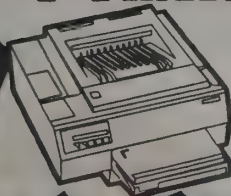
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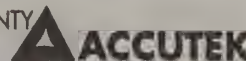
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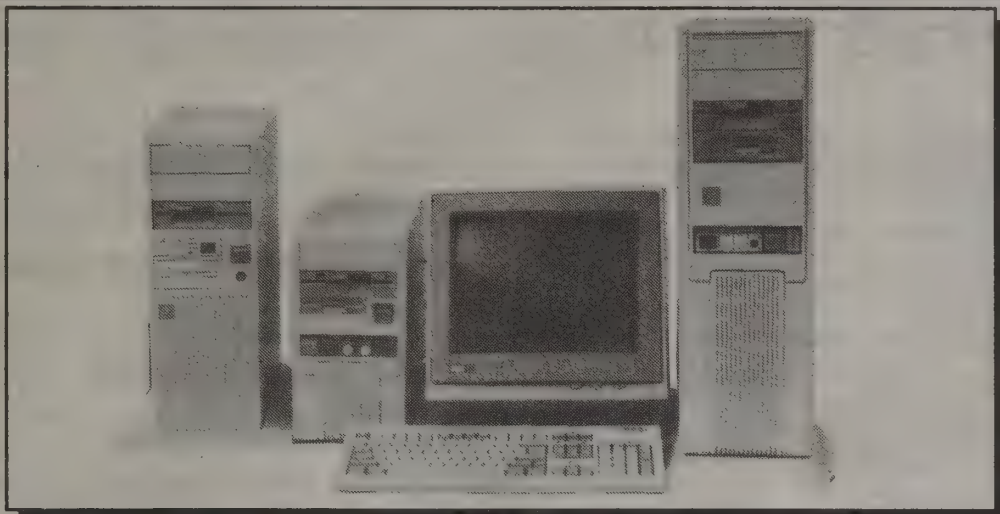
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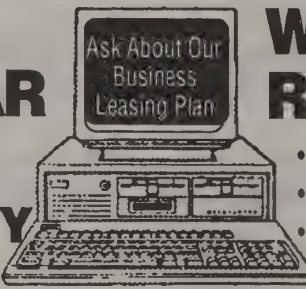
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Bill Gates And No Sympathy For The Devil

*Or An Interview With Mr. B. L. Zeebub—
Astonishing True Story*

BY JOHN C. DVORAK

On April 15, 1992, I was granted an exclusive interview with the master of darkness, Mr. B. L. Zeebub, head honcho of the underworld, sometimes known as "Satan" or "the devil." Since I avoid association with his clan, he contacted me by MCI Mail to set up a meeting. He had learned that I was looking into various industry moguls who are believed to have made a deal with the devil, and that I had become something of an expert on the subject.

Because of an unusual deal he made with Bill Gates, Mr. Zeebub thought it would be good to have a meeting. We chose a neutral spot, the lobby of the San Francisco Marriott, to meet. The conversation was taped, and the following is an edited transcript.

DVORAK: So exactly why did you call for this meeting? I find this unusual.

ZEEBUB: It's quite out of the ordinary for me, too, but I have done quite a few deals with many of the richest men in high technology, and I want to go public with the information.

DVORAK'S LAST COLUMN

DVORAK: Why? What difference does it make?

ZEEBUB: Not wanting to name names, I did a deal with Bill Gates, and it's causing some confusion and consternation with some of the other fellows.

DVORAK: Bill Gates? Don't tell me he sold his soul to become a billionaire?

ZEEBUB: Well, that's what we thought at first.

The deal was pretty straightforward. He's one of the richest men in the world and can have anything he wants. This is, of course, thanks to me. After he's dead I'm supposed to have certain rights that supersede normal procedure. Now we've discovered that this will never happen.

DVORAK: So he sold his soul to be rich?

ZEEBUB: It's not that simple. Gates is too smart for that kind of a deal. He's a tough negotiator. I think the contract is a bit unusual.

DVORAK: For example?

ZEEBUB: Well, his attorneys did a great job—and I admit this—making sure that he's protected from those notorious tricks you've heard so much about.

Gates' people made sure none of that kind of nonsense was allowable. We actually may have been premature when we signed it. He seems to have a lot of clauses my people didn't understand. We were so concerned with his soul that we didn't pay enough attention to his attorneys. The guy just doesn't look that threatening.

DVORAK: Uh, let me get this straight. You did a deal with Gates and

the deal favored him?

ZEEBUB: Well, it actually may be worse than that. I'm not sure what to do about it.

Gates' deal has some interesting performance clauses and some fallback language that they slipped by us. Gates requires that his net worth increase \$10 billion by the end of 1992 and then double each year for the next five years. It was written in such a way that we didn't see how the numbers were going to increase so fast.

My people are having a hell of a time, pardon my French, maintaining his wealth curve. We got him up to eight billion or so and can probably meet this year's requirements, but to double it again is going to be tough.

DVORAK: So throw in the towel. What's the big deal?

ZEEBUB: It turns out that if we don't perform, Gates gets my business.

DVORAK: What do you mean, "gets your business?"

ZEEBUB: Takes over the business. You know, like, owns it.

He gets all those contracts from me. Can you imagine what will happen when those guys who signed up with me from Sun Microsystems, for example, find out that Gates gets their souls!?!?

DVORAK: You mean he'd get their souls? Like for eternity? That kind of thing? What would he do with them? What about when he grows old and...

ZEEBUB: Oh, he's already immortal. That was another deal he did with an associate long ago. Bill Gates is 208 years old! If I had known about it I wouldn't have done this deal in the first place.

Anyway, I have no idea what he'd do with their souls. Auction them, I suppose. It's not them I'm worried about.

DVORAK: Who are you worried about?

ZEEBUB: Me. My counselors *now* tell me that if I go into default he will actually own *my* soul.

DVORAK: Wow. First the business, then the soul. How could such a thing happen? What would it mean to the scheme of things?

ZEEBUB: That's what we're trying to figure out. My long-term obligations to the universe and the good-evil continuum are in jeopardy. There's a rumor going around that Gates wants to parcel hell, put in a fake beach and sell condos. It's not that I care that much about the property. It's the principle of the thing.

DVORAK: So what's the point of this meeting?

ZEEBUB: Do you know any good lawyers?

DVORAK: I thought you had them all in hell.

ZEEBUB: They don't keep up with current cases.

Shortly thereafter I left Mr. Zeebub in the Marriott lobby. He looked depressed. I agreed to publish this interview as a plea for an attorney for the devil. I'm told the attorneys know how to get in touch with him. ■



© 1992 by John C. Dvorak. All rights reserved. John C. Dvorak graduated from the University of California. He is a contributing editor of PC Magazine and MacUser, and is considered by many to epitomize the contrarian view of things—a charge that he vehemently denies. Dvorak's motto is: If you have nothing nice to say, then don't say anything at all.

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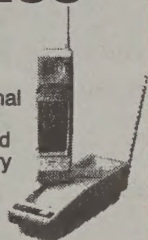
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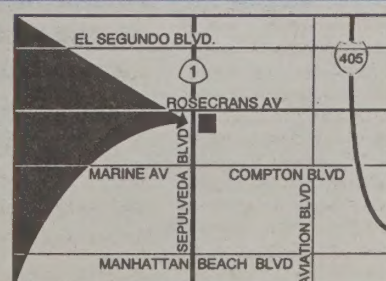
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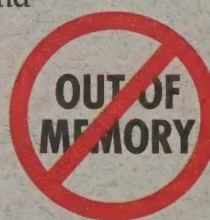
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PC Week rated QEMM 6 the best memory manager.



Quarterdeck

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